Chemical Week

October 13, 1956

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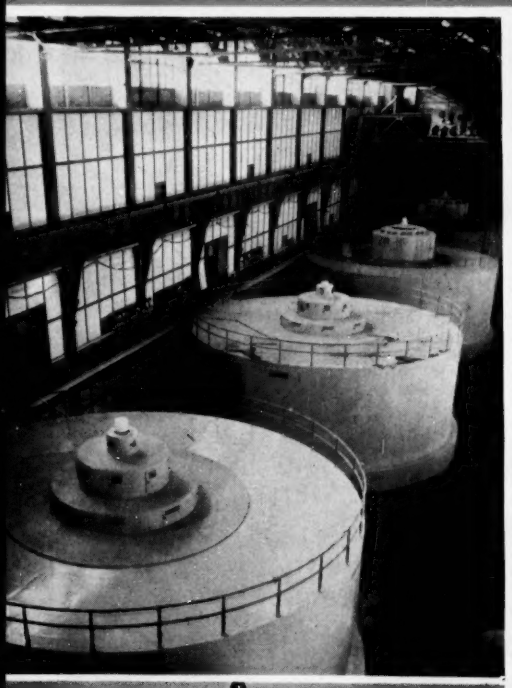

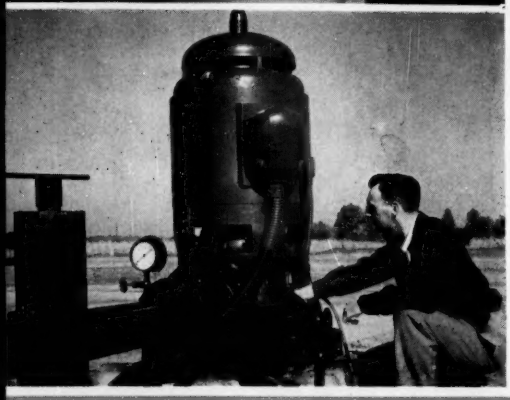

More coal-chemical capacity is certain. The question is whether gov't will grant tax write-offs p. 21

Japanese power projects: they augur stiff competition for U. S. electrochemical exports . . p. 32

Auto repainting is big business, too. Shops pay $250 million/yr. for refinishing specialties . . . p. 50

Secondary oil recovery—there's plenty of opportunity for the right broad-spectrum bactericide p. 83

Don't expect a barite shortage in the near future. Consumption is up; but so are imports . . . p. 102

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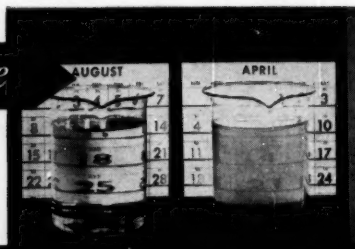

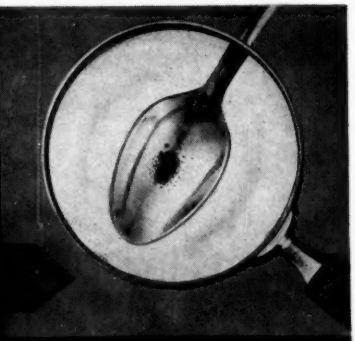

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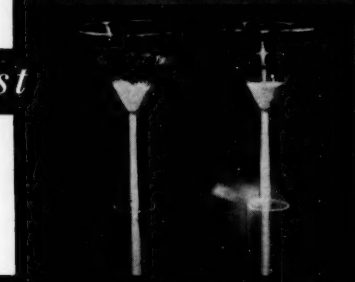

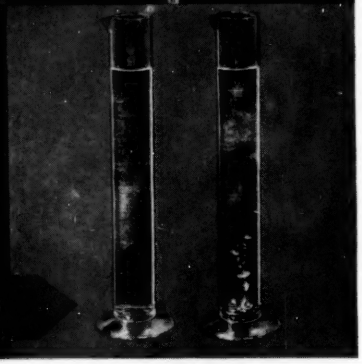

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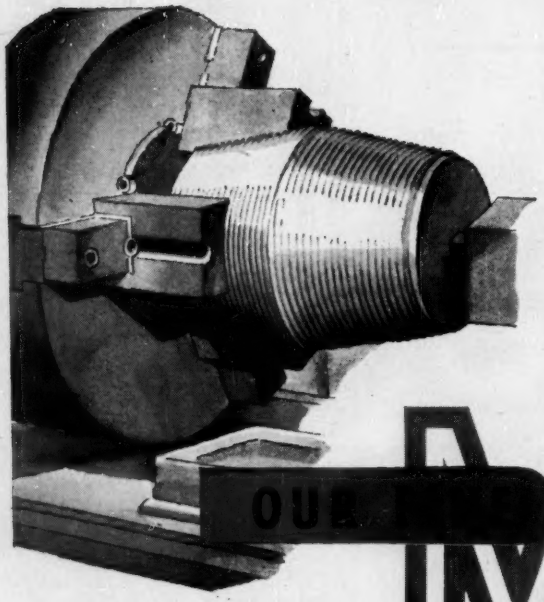

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Chemical Week

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October 13, 1956

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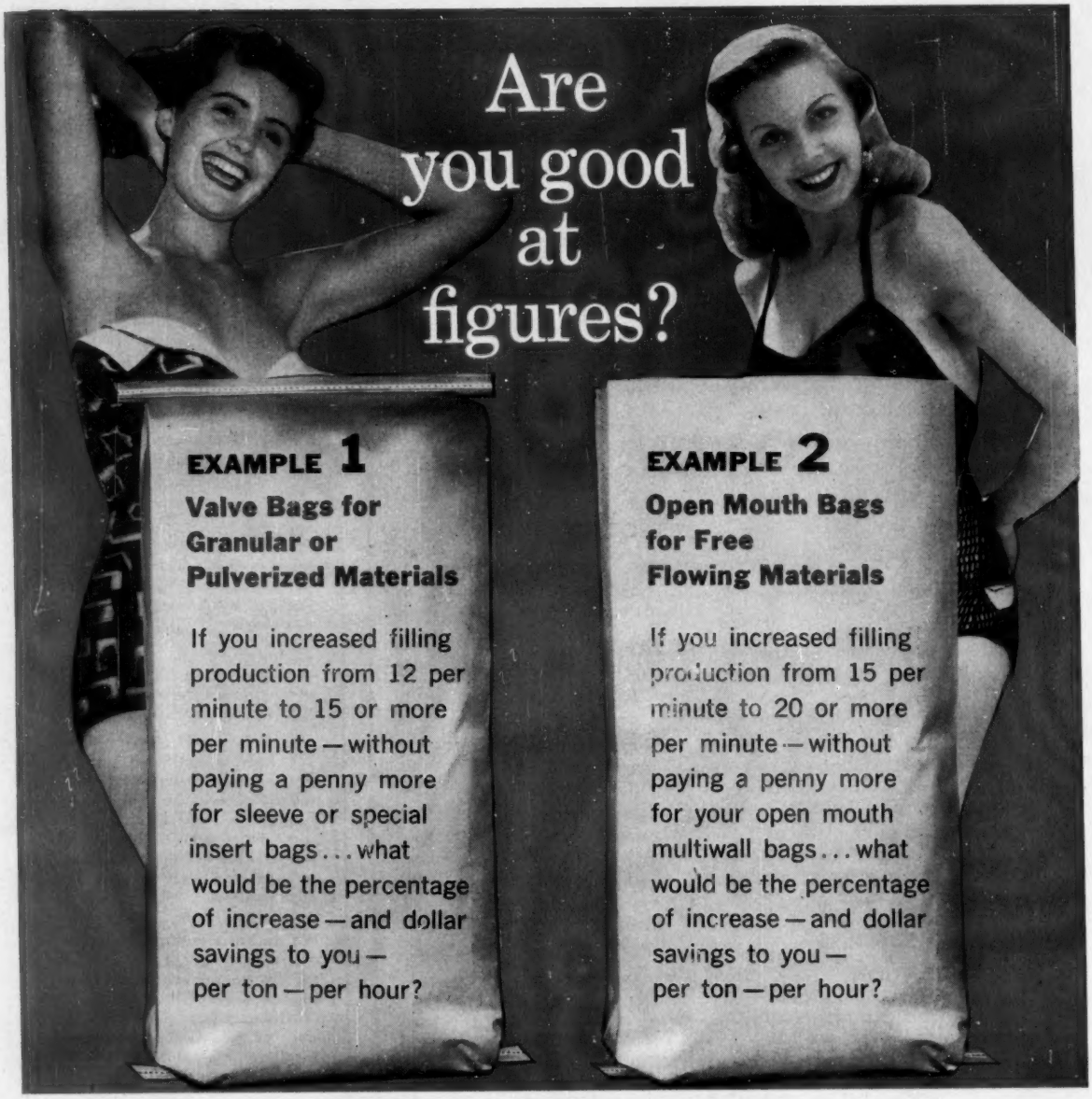
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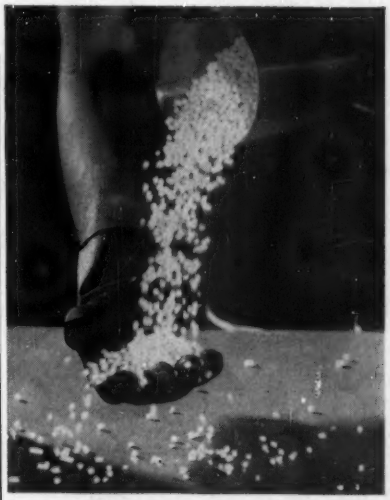

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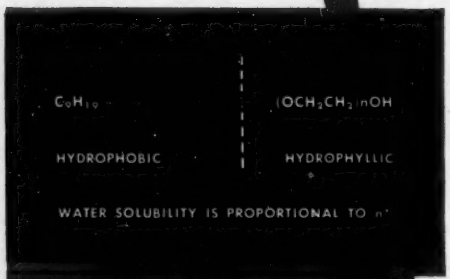

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Igepal CO-430	4	44	Insoluble in water
Igepal CO-530	6	54	Cloudy at 32 F.
Igepal CO-630	9-10	65	126-133 F.
Igepal CO-710	10-11	68	158-165 F.
Igepal CO-730	15	75	203-212 F.
Igepal CO-850	20	80	Clear at 212 F.
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*Moles of ethylene oxide per mole of nonylphenol

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Stabilizer for synthetic latices.
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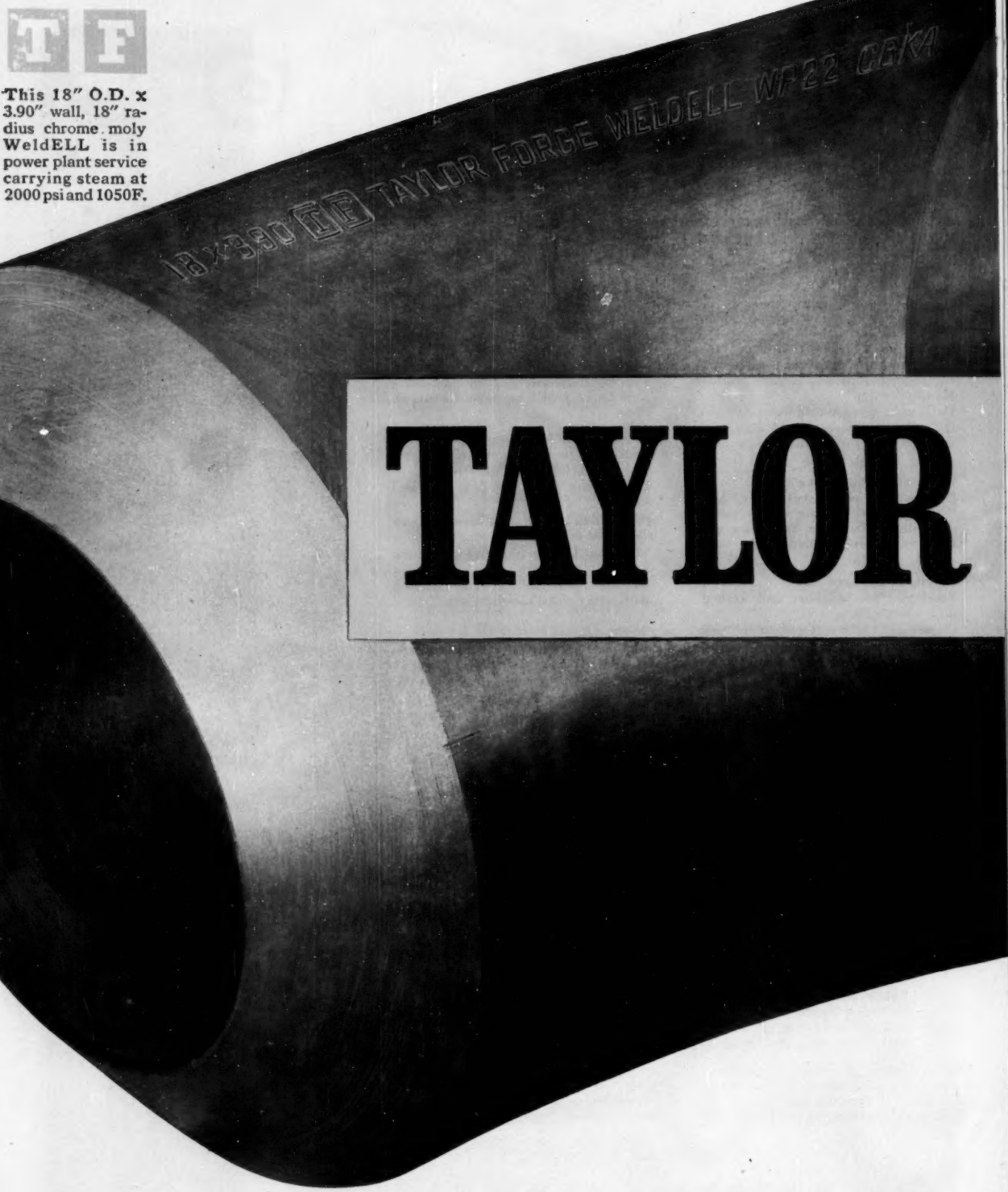

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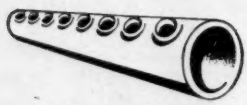
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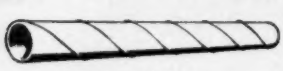
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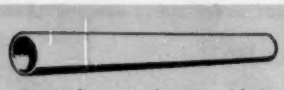
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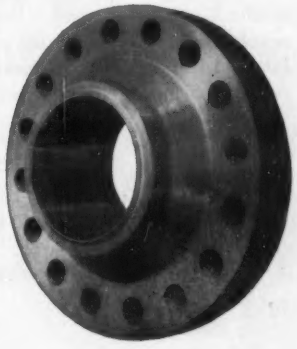

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a report by LINDSAY

In its restless search for knowledge, science has brought us to the threshold of space, our eyes on the infinity of the universe while we are continuing our investigation of the many mysteries that still exist here on our own planet. One of the richest, most exciting of these virtually unexplored realms lies in that little known group of versatile metals—the rare earths.

There are 15 rare earths—atomic numbers 57 through 71—and together they occupy about .012% of the earth's crust. They are remarkably alike in their chemical behavior because of their atomic structure. The main difference lies in the disposition of the three outermost electrons. The difference is always slight; the heavier rare earth atoms have a smaller radii, hence are denser than the lighter ones.

This characteristic makes separation difficult, but it also makes the rare earths ideal subjects for the study of the magnetic properties of materials and to test various theories of physical chemistry and physics. The rare earths may hold the combination that will unlock many of the secrets of nature.

Industry, too, is turning to the rare earths in a search for materials to improve products and processes. And they have found that the rare earths offer enormous potentials. Already many of these metals are being used in a variety of industrial fields.

Rare earth chloride is a combination of the chlorides of cerium, lanthanum, neodymium and praseodymium with smaller amounts of samarium, gadolinium and less common rare earth chlorides. From this material comes misch metal used in lighter flints and as an additive in many grades of steel. Rare earth chloride also serves in the production of chrome, dentifrices, silk, aluminum, fertilizer and catalysts.

Cerium, most common of the rare earths, is widely used, in its oxide form, as a polishing agent for optical and other forms of glass. Cerium hydrate is an ingredient in the production of the special glass used to view highly radioactive operations.

The rare earths have drying properties that can be useful in the production of better paints. And, neodymium and praseodymium have potential value as colorants in the manufacture of ceramics.

The petroleum industry is investigating the use of rare earths as catalysts in their cracking plants. And this unique group of metals shows promise in catalytic polymerization—a problem in the manufacture of many synthetic fibers and plastics.

Thulium, made radioactive, emits X-rays of proper length and strength for diagnostic use. A pea-sized bit of thulium will last a year as the source of rays in a small, portable X-ray unit . . . a device which would be of great value to physicians and hospitals.

Much of the interest in rare earth and thorium chemicals has been sparked by Lindsay scientists. Since the days of the incandescent gas-mantle lamp, in the last years of the 19th Century, Lindsay has worked and pioneered in this field. Expansion has come as researchers at Lindsay and in science and industry have uncovered new uses for the rare earths. Just recently Lindsay has expanded its ion exchange installation and now has 100 columns in operation at its West Chicago plant for the separation of some of the "rarer" rare earths in commercial quantities and in purities up to 99.99%.

If you think there is even a remote possibility that the rare earths might have significant applications in your industry, you may find it worthwhile to talk with our technical people. The data obtained through our years of research is available to you and we can supply you with rare earths in quantities from a gram to a carload.

PLEASE ADDRESS INQUIRIES TO:

LINDSAY CHEMICAL COMPANY

270 ANN STREET, WEST CHICAGO, ILLINOIS

it won't be long now!

Soon we will have an ample supply of butadiene for current and prospective uses and also offer isomers of n-butylene 1 and n-butylene 2 for new markets and new product developments.

We will welcome discussion of your future requirements and will do everything possible to foster the growth of butane-derived hydrocarbons.

BUTADIENE • n-BUTYLENE 1 • n-BUTYLENE 2

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OPINION

Chemicals—Not Economics

TO THE EDITOR: I read with interest your write-up on the chemical future of the Twin Cities . . . (*Aug. 18*) and agree with your prognostications on future expansion.

In your roster, however, you have omitted an important chemical company, which I believe is larger than about half of the companies listed. Perhaps the fact that its name is Economics Laboratories, Inc.—rather than one implying chemical business—has contributed to this omission. Nevertheless, this St. Paul concern is selling over $15 million per year primarily in the detergent field. Its tradenames are well known by institutions and consumers. It has a strong chemical research department responsible for several new products, and with many more to come. . . .

ROBERT S. ARIES
R. S. Aries & Associates
New York

Program for Pollution

TO THE EDITOR: I found your Aug. 11 article about air pollution in Germany very interesting, especially because we had some visiting specialists about two years ago.

I gathered at that time that the German people, including "well-mannered" industries, other businessmen, farmers and householders, all wanted the same air pollution control results as the American people want. That is, they wanted the effects of air pollution to be reduced in the following eight categories:

(1) Property damage.
(2) Vegetation damage.
(3) Soiling of surfaces.
(4) Sky darkening.
(5) Limited visibility.
(6) Annoyance to the senses of people.
(7) Interference with production and services.
(8) Damage to health.

If they are to achieve these, the Germans will undoubtedly need an air pollution control program that consists of far more than the right to sue for the recovery of proved damages as was indicated in your article.

A full program requires the establishment and crystallizing of a general attitude by the collection and dissemination of accurate information to laymen and specialists. In addition, a legislative and governmental administrative program of action is needed to assist those who are willing to carry out their responsibilities in reducing the air pollution they create while at the same time enforcing the community's standards against the small percentage of recalcitrants.

The costs of controlling air pollution are not inconsiderable, but the figures of 10-20% of plant investment seem to me to be exaggerated, especially as an average.

Even a cement plant can be really cleaned up for less than 10% of plant capital costs. Three cement plants in this part of Michigan required about 8% of plant investment for air pollution control equipment. One plant was brand new; the other two plants were already in existence and therefore required "shoe-horn" installations.

While the gross figures of possible costs are dramatic and scary when it is recognized that these costs will be spread over a few years at the time, it seems that each industry will be able to "eat its elephant by cutting it up into small pieces."

It isn't an easy task to clean up the air of an area, but I am certain it is easier to accomplish with the total incentive of a well-rounded program that covers homes, business operations and government buildings than with the single incentive to industry: "If you don't clean up somewhat, your neighbor can sue you and collect damages." I would suggest that interested Germans join the Air Pollution Control Assn., 4400 Fifth Ave., Pittsburgh 13, Pa., and learn from its members through meetings and/or publications about the practical methods used by many communities, including Detroit, in cleaning up their air.

BENJAMIN LINSKY
President
Air Pollution Control Assn.
Pittsburgh.

Matter of Words

TO THE EDITOR: Some weeks ago you carried an article titled "Kickbacks are Hurting Textile Chemical Sales." This article has provoked squeals of indignation here in the South, and although your article did make mention of the fact that this practice was not at all common in the South, the general indication is that the textile trade finds itself highly insulted. As a matter of fact, a rival textile publication, whose editor I know very well, is conducting a survey to refute your article in a future issue. The honor of us textile men—especially Southern textile men—must be cleared!

Why am I writing you? I am not a textile man. I am a textile chemist, chief chemist for a manufacturer of textile chemicals. I am writing simply because I feel that there must be some truth to what you say. I have known of instances where our products have proven themselves, performance-wise, to be a better money value than products in use in a particular mill, yet we were never able to make entry because of some peculiar tie-up that the competitor had with the subject mill. I am writing simply to warn you of a "white-wash" that is coming.

". . . Your choice of words was unfortunate. It would have been better to say "High Selling Costs Are Hurting Textile Chemical Sales." That would have been more to the point, and would not have raised the cries of indignation that followed your revelation. As a matter of fact, outright "kickbacks" are a thing of the past, and probably stem back to New England practice. The South has tried to rid itself of this pestilence, and I must say that on the whole self-policing of the trade seems to be doing its job, as far as concerns actual "kickbacks."

There is flourishing a "gray market" of entertainment that may or may not be out of line with common American industrial practice. Naturally, the cost

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

ATLAS chem-memos

CHEMICALS DIVISION
ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE
Atlas Powder Company, Canada, Ltd., Brantford, Ontario, Canada

NEW DRILLING FLUID

...using Aquaness emulsifiers—speeds drilling of oil wells

The guys who drill oil wells have been telling us nice things about a new oil emulsion drilling fluid that recently appeared on the market. These fluids, in case you didn't know, are pumped into a well hole to lubricate and cool the drilling bit, and raise the chips cut out by drilling.

From all reports, the new fluid makes the drilling operation faster and more economical. Out in the Permian Basin, in West Texas and New Mexico, a test run of more than 20 wells were drilled using the new oil emulsion fluids and conventional types. The results: only 26 drilling bits on the average were needed per hole with the new fluids, compared to 45 bits when water and conventional muds were used.

Furthermore, the new fluid permits use of greater weight on the bit, and gives faster penetration rates . . . all of which further adds to economy of drilling.

The drilling fluid uses synthetic emulsifiers, manufactured by the Aquaness Department of Atlas, long recognized as a leading developer and supplier of special emulsifiers for the oil industry. Several of the largest drilling mud companies market the Aquaness emulsifiers under their own brand names, and engineer their application to individual wells. If you'd like more facts, write to Baroid about "Trimulso"—to Magcobar about "Drilling Milk"—and to Macco about "Lumul,"—all top names in the drilling mud business.

Tougher rayon for stronger tires...made using Atlas surfactants

One of the reasons why your automobile tires rack up mileages that were impossible a few years ago is that they're made with a new, extra-strong grade of viscose rayon cord. This "super-tenacity" rayon goes into such other strength-demanding products as fire hose, conveyors and drive belts.

There's a unique bit of surface active chemistry at work here. Atlas surfactants have long been recognized for the part they play in static control and lubrication *on the surface* of man-made fibers. In this new type of rayon, however, another Atlas surfactant performs a different kind of function *inside* the rayon fiber.

From 1 to 4% by weight of this Atlas surfactant is added to the "liquid rayon" just before it is converted to solid form. The surfactant slows down the rate at which the rayon molecules re-arrange themselves. Then, before the rayon has become thoroughly solidified, it is stretched. This process gives it a tougher, more uniform cross section, extending all the way through the fiber. The result is far greater strength per unit of diameter...and a lot longer life in an auto tire.

This is just one of the many interesting jobs that Atlas surfactants are doing in scores of products. We've developed a wide variety of these useful materials, and a stock of knowledge on how to use them. Let us know your problem and we'll be glad to offer recommendations.

When things look hazy...call on DARCO®

If you have a liquid product that sometimes turns hazy or cloudy after it leaves your plant, Darco activated carbon usually can prevent this trouble . . . and save you embarrassing complaints from customers.

Such delayed turbidity is generally caused by materials that are at the point of falling out of solution when the product is prepared . . . then, after shipment, changes such as temperature drop or addition of other ingredients, bring on precipitation. Happily, many of these trouble-makers are large molecules which are easy to remove while still in solution by treatment with Darco activated carbon. You correct the condition while the product is still under your control, in your own plant.

Floc-forming impurities in sugar, which would cause haze in carbonated beverages, are an example. Many sugar refiners use Darco treatment to produce sugar of the quality grade demanded by the beverage trade. Brewers, too, use Darco to give beer better "chill stability." Darco-treated beer, they find, can be kept in cold storage far longer without developing chill haze, due to precipitation of certain nearly insoluble proteins.

Let us know about your haze problem, and we'll be glad to suggest ways that Darco activated carbon can help.

of such practice is borne by the mill, who pays for it through lowered quality in the products it buys. It also hurts the man who tries to manufacture a quality product and is forced to sacrifice quality to pay for high entertainment run up by his salesmen. It also very often results in a "social race" between suppliers to see who can provide the most lavish "splurges" for his customers. All in all, it spells high sales costs, lowered quality in the chemicals sold, and loss of money to the mill in the long run, for really they are paying for the ultimate cost.

What about obligations? That is hard to pin down. A dyer that has been taken on a Florida fishing trip will surely be "friendly inclined" to the supplier who has furnished the trip. But when the trips are frequent, and by many suppliers, then the actual obligation is hard to tie down. It becomes a trade practice. Under such circumstances it becomes hard to define actual "obligation," although the "friendly inclination" towards the entertaining supplier does exist.

Please do not use my name. I am too well known in the trade, and my company is too well known. I admire your publication, and am a confirmed reader. I think you had a bit of truth in your article, although your wording was unfortunate.

NAME WITHHELD

No insult intended for the chemical or textile industry. CW's intention was to point up a situation that is hurting both.—ED.

Bait for the Fly

TO THE EDITOR: The article concerning the Mediterranean fruit fly in Cyprus (*Sept. 15, p. 61*) mentions the fact that the Medfly last year destroyed almost $1 million worth of fruit in Cyprus, and points out that the Cyprus Dept. of Agriculture will launch its most vigorous campaign against the pest, employing the same kind of insecticide—malathion in sugar bait—that U.S. authorities are using in Florida where the Medfly has recently been wreaking havoc.

I would like to point out that in this eradication program a sugar bait was not used, but that a protein hydrolyzate, which our company supplies, was used as the attractant for the fly. At least this is what they have been using recently and are presently using at this time, and during the entire period beginning with the infestation, which commenced about April 23. As far as we know, a sugar bait has not been used in the large-scale eradication program in Florida.

M. J. THOMAS
Assistant Manager
Market Development Division
A. E. Staley Mfg. Co.
Decatur, Ill.

For the Ladies

TO THE EDITOR: Read your article "Management Makes Way for the Ladies" (*Oct. 6, p. 65*). It's about time.

ST. T. MOSSHART
Philadelphia

Name or Description?

TO THE EDITOR: We wish to thank you for publishing the news . . . covering our graphite heat exchangers (*Sept. 15, p. 75*); however, in re-editing our description of the product, several erroneous assumptions were made, namely that it is a solid block into which holes have been bored, neither of which is correct.

Most importantly, however, you have used the registered trademark of a competitor's piece of equipment, namely, Cross-Bore, which does not appear in our news release and which has been included by you and has been spelled the same way as the registered trademark of Falls Industries Inc., which applies to a cylindrical type of heat exchanger apparatus.

J. G. KEARNEY
Delanium Graphite Co.
Elizabeth, N. J.

Our use of the term "cross bore" was purely in the descriptive sense. CW did not foresee any conflict with Falls Industries' trademark, and we regret any confusion that may have resulted.

Belly Laugh

TO THE EDITOR: Just want to pass along my thanks for the "belly laugh" I got out of the cuts of Brownell and Modarelli (*Aug. 4, p. 36*). The judge seems to enjoy needling the government!

H. H. FAVOR
Manager, Foods Dept.
R. T. Vanderbilt Co., Inc.
New York

MEETINGS

Salesmen's Assn. of the American Chemical Industry, 5th chemical sales clinic, Hotel Commodore, New York, Oct. 15.

National Assn. of Corrosion Engineers, Drake Hotel, Philadelphia, Oct. 15-17.

Assn. of Official Agricultural Chemists, 70th annual meeting, Shoreham Hotel, Washington, D.C., Oct. 15-17.

Canadian Agricultural Chemicals Assn., 4th annual meeting, Sheraton Brock Hotel, Niagara Falls, Ont., Oct 16-18.

Antibiotics Annual Symposium, Willard Hotel, Washington, D.C., Oct. 17-19.

Federation of Paint and Varnish Production Clubs, 34th annual meeting, Netherland Hilton Hotel, Cincinnati, Oct. 21-24.

Assn. of Consulting Chemists and Chemical Engineers, Inc., annual banquet and symposium, Hotel Belmont Plaza, New York, Oct. 23.

National Assn. of Corrosion Engineers, Gunter Hotel, San Antonio, Tex., Oct. 23-26.

American Society of Mechanical Engineers and the American Institute of Mining, Metallurgical and Petroleum Engineers, solid fuels conference, Sheraton Park Hotel, Washington, D.C., Oct. 25-26.

American Council of Independent Laboratories, 29th meeting, Savoy Plaza, New York, Oct. 28-Nov. 1.

American Management Assn., Hotel Roosevelt, New York, Oct. 31-Nov. 2.

Commercial Chemical Development Assn., meeting on soaps and detergents, Netherland-Hilton Hotel, Cincinnati, Nov. 1.

Scientific Apparatus Makers Assn., The Homestead, Hot Springs, Va., Nov. 7-10.

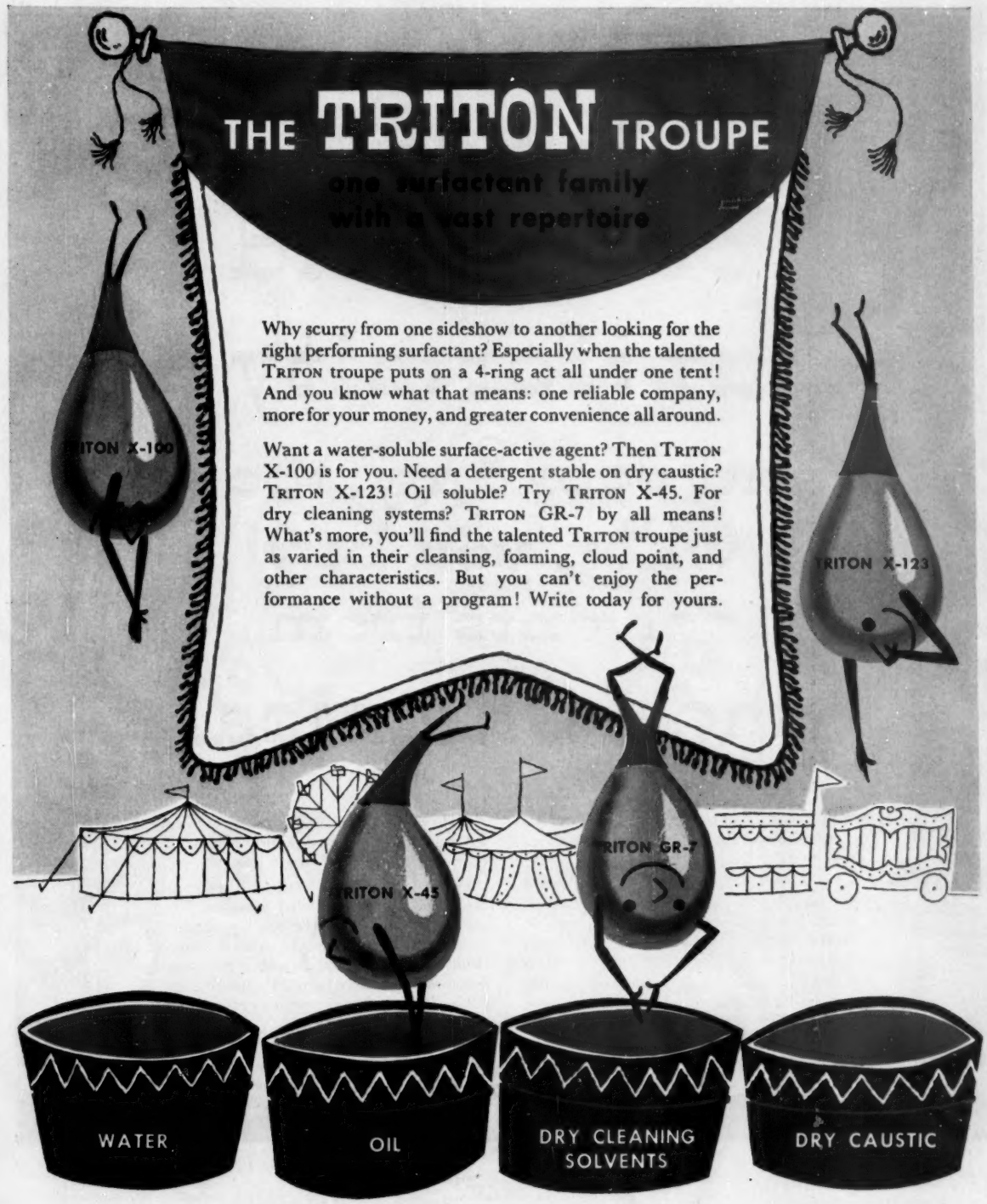
American Chemical Society, 9th National Chemical Exposition, Cleveland Public Auditorium, Cleveland, Nov. 27-30.

American Institute of Consulting Engineers, annual dinner, Waldorf-Astoria, New York, Nov. 27.

American Institute of Chemical Engineering, annual meeting, Statler Hotel, Boston, Dec. 9-12.

American Nuclear Society, Sheraton Park Hotel, Washington, D.C., Dec. 10-12.

American Pharmaceutical Manufacturers' Assn., Waldorf-Astoria Hotel, New York, Dec. 10-12.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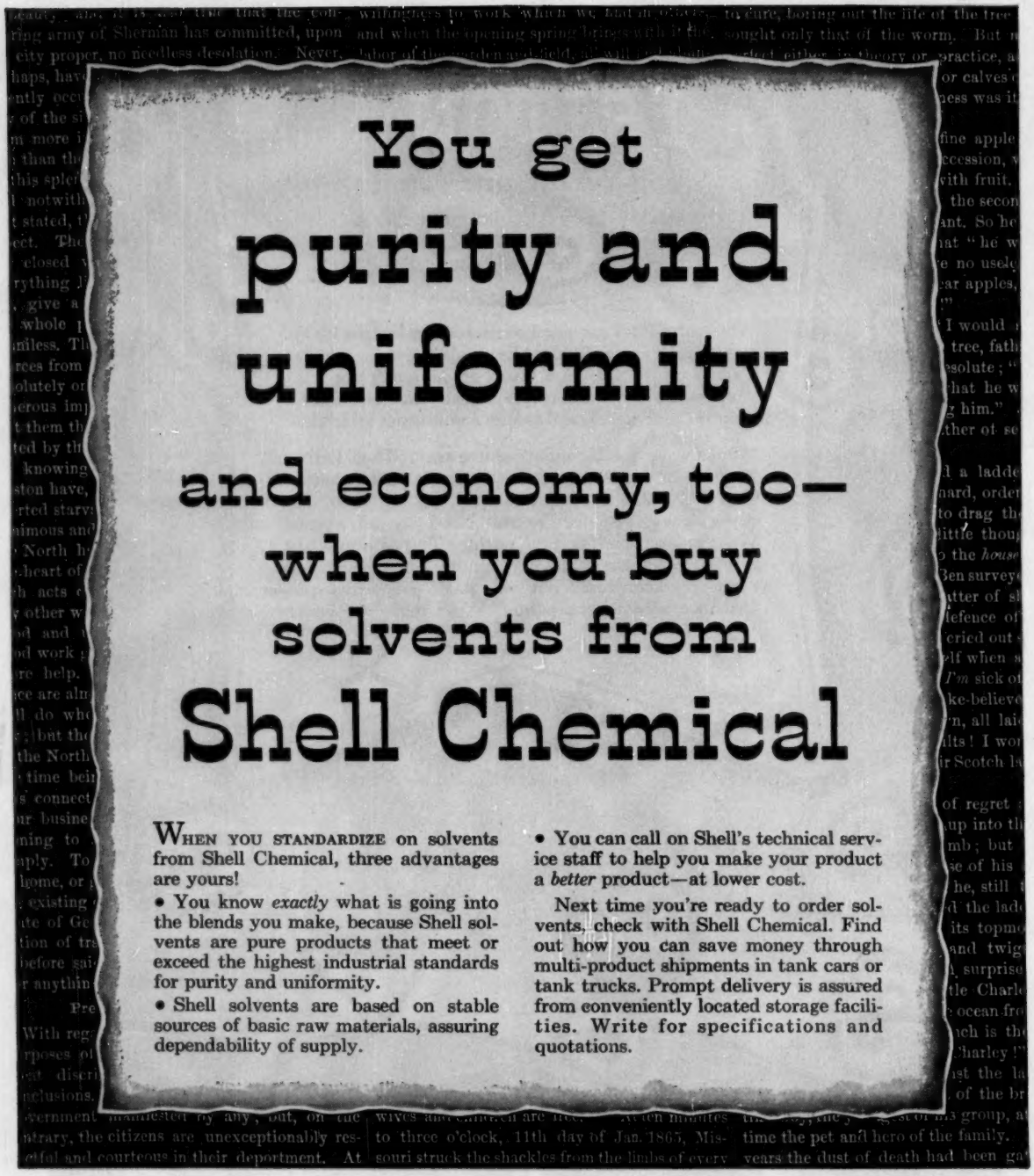

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SHELL

Business Newsletter

CHEMICAL WEEK
October 13, 1956

Antitrust questions are becoming more important to chemical process firms than they've ever been before. And, paradoxically, one of the reasons for an upsurge in such activity was Du Pont's victory in the cellophane antitrust case (*CW, June 23, p. 21*).

This decision—that monopoly is to be judged on domination of a market, not of a single item interchangeable with others—is the one with which the government hopes to block the amalgamation of Continental Can and Hazel Atlas, and which it may use if it decides to oppose the Continental-Robert Gair merger. Both mergers broaden Continental's packaging line.

Vertical mergers, too, are under attack. The Federal Trade Commission is currently eyeing Union Carbide's proposed acquisition of Visking (*CW, Sept. 29, p. 23*)—though FTC attorney's won't say whether their interest is more than a "routine" one. But Washington observers point out that this merger has a few points of similarity to the Scott Paper mergers that would have helped the firm integrate vertically. The government filed suit last June to stop Scott's acquisitions from going through.

Antitrust standards may be applied on mineral development, too. The possibility was raised when Sen. Joseph O'Mahoney (D., Wyo.) asked Interior Secretary Fred Seaton whether his department weighs the question of "economic concentration" in approving the assignment of mineral leases.

It's the Freeport Sulphur-Humble Oil agreement on Humble's offshore sulfur leases (*CW, Sept. 29, p. 21*) that brought up the question. O'Mahoney asked a delay in transferring Humble's lease to Freeport to allow a Senate subcommittee group he heads to study competition in the sulfur industry—whether Freeport, by getting rights to these offshore deposits, would become too big a factor in the industry.

Retorts Freeport: "Even the most cursory examination of the industry will show that competition is vigorous and expanding." Too, it feels that by virtue of its salt-water Frasch process know-how, it is the firm best qualified to undertake such a project.

Right now, Interior Dept. men are uncertain of their authority to apply monopoly standards in deciding whether or not to transfer the lease to Freeport. But Secretary Seaton, with his reputation as a liberal on conservation issues still intact, will have to decide whether such standards should be taken into account—unless, of course, he can (1) get an opinion from government antitrusters that the transfer would not cause undue economic concentration, or (2) find some other grounds—perhaps in differences between state and federal leasing procedures—that would let him reject the transfer.

But if the lease is not transferred, Humble and Freeport might sign a different type of agreement allowing Freeport to help exploit Humble's deposits.

•

Other expansions are on firmer ground.

Shell Chemical is putting the finishing touches into its 150-tons/day urea plant at Ventura, Calif., should have it onstream this month.

Du Pont will soon start up its new neoprene plant at Montague, Mich.

Ethyl Corp. will build a tetraethyl lead plant in the San Francisco Bay area.

Shea Chemical will erect its third sodium phosphate unit at Adams, Mass., where it now has other manufacturing facilities.

B. F. Goodrich Chemical is beginning construction of its third plant at Calvert City, Ky. The unit, to cost $2.5 million, will produce specialty acrylic polymers, will come into operation a year from now. Goodrich now makes acrylonitrile and vinyl chloride at this Kentucky location.

•

Atlas Powder is moving further into the plastics field by acquiring Thermaflow Chemical Corp. (Tunkhannock, Pa.), which specializes in producing high-impact reinforced-plastic molding compounds. Atlas produces polyester resins used in making such compounds.

An acquisition, of a sort, may be ahead for Smith-Douglass. It has asked court permission to reopen and operate the Texas City Chemicals dicalcium phosphate plant at Texas City, until a reorganization plan, under which it would become controlling stockholder in the bankrupt TCC, can be ruled on by the court. The plan, says Smith-Douglass, has already been tentatively accepted by some TCC creditors.

•

There'll soon be "more union" for management to contend with in the chemical industry. That's the conclusion being drawn from the vote at last week's convention of the International Chemical Workers Union. President Edward Moffett—who has favored "a long courtship" before any merger with the Oil, Chemical and Atomic Workers—was defeated in his bid for re-election. New president is Walter Mitchell, who will work for unification with no undue delay.

•

Is financier Louis Wolfson moving further into the process industries? Yes, say stockbrokers, who report that he has bought more than 10% of the stock in Brown Co. (Berlin, N.H.), pulp and paper maker.

BRIEFS for buyers of

Trichlorethylene
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Chlorobenzenes
Caustic Potash
Carbonate of Potash

Nialk® Trichlorethylene—extraction, technical, and X-1 grades

You can now get trichlorethylene from Hooker in several grades under the Nialk brand name.

Technical Grade has no HCl acidity and a maximum of 0.001% alkalinity as NaOH. It boils at 86.6 to 87.8°C. at 760 mm. Used as a freezing-point depressant in carbon tetrachloride fire extinguisher fluids, as a solvent in various adhesive formulations, and in other similar applications.

Extraction Grade has no HCl acidity. Its alkalinity as NaOH is .006 to .008% maximum. It boils at 86.6 to 87.4°C. at 760 mm. Used for extracting fats from animal matter, oil from raw wool, cottonseed, flaxseed; pharmaceutical and other uses.

X-1, a special grade, is available for those uses requiring a product of exceptionally high quality.

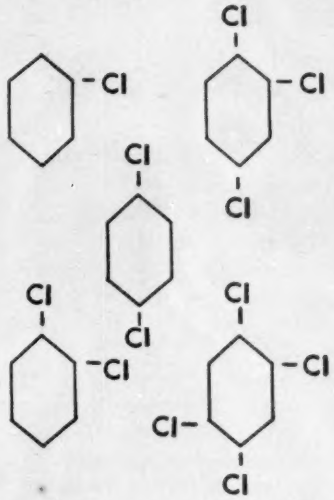
Send for bulletins.

Technical Data Sheet No. 787 gives a resume of important information on all grades. For more detailed information on Nialk Trichlorethylene and its uses, send for Bulletin No. 44, a 40-page booklet covering physical and chemical properties, shipping containers, safe handling procedures, etc.

Cylinder chlorine now readily available

You can now purchase Nialk® brand chlorine from Hooker in 100- and 150-pound cylinders and one-ton containers.

5 chlorobenzenes and their uses



Whether you use them as solvents or intermediates, you're sure of finding exactly the right formula among these five Hooker chlorobenzenes:

Monochlorobenzene. Liquid solvent and intermediate. 99.5% pure as determined by cryoscopic methods.

ortho-Dichlorobenzene. Technical. Liquid solvent and intermediate. 85% to 87% pure *ortho* with *para* as major impurity.

para-Dichlorobenzene. Solid, widely used as insecticide and sanitary deodorant; also as intermediate. 100% pure. 7 mesh sizes available.

Trichlorobenzene. Technical. Liquid, usually used as solvent. Mixture of 1,2,4- and 1,2,3-trichlorobenzene with 1,2,4-predominating.

1, 2, 4, 5-Tetrachlorobenzene. Solid, usually used as intermediate. Contains 65.7% chlorine.

You can get more information on any of these chemicals by checking the coupon.

Pioneering in potash

The first caustic potash and carbonate of potash to be made commercially in this country were sold under the brand name Nialk®.

You can now buy these products from us, we're proud to state—still under the Nialk brand.

Altogether, we're supplying a substantial part of this country's caustic potash requirements, and the bulk of its carbonate of potash needs. This, we believe, is good testimony of Nialk special skills and service down through the years.

If you'd like to find out just why these skills and service have inspired such confidence, and how they might benefit your processing, send for technical data sheets on Nialk caustic potash and carbonate of potash, and for descriptive bulletin on both. Just check the coupon.

For more information
on chemicals mentioned here, check below:

- ☐ NIALK Caustic Potash (Data Sheet)
- ☐ NIALK Carbonate of Potash (Data Sheet)
- ☐ NIALK Caustic Potash and Carbonate of Potash (44-page Bulletin)
- ☐ NIALK Trichlorethylene (Data Sheet)
- ☐ NIALK Trichlorethylene (40-page Bulletin)

Chlorobenzenes:

- ☐ Mono-
- ☐ ortho-Di
- ☐ Tri-
- ☐ 1,2,4,5-Tetra-
- ☐ para-Di-

Is your data file up-to-date on these other Hooker chemicals? Check here if you'd like technical data:

- ☐ Benzoic Acid, U.S.P. and Tech.
- ☐ Sodium Benzoate, U.S.P. and Tech.
- ☐ Caustic Soda
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- ☐ Sulfur Chlorides

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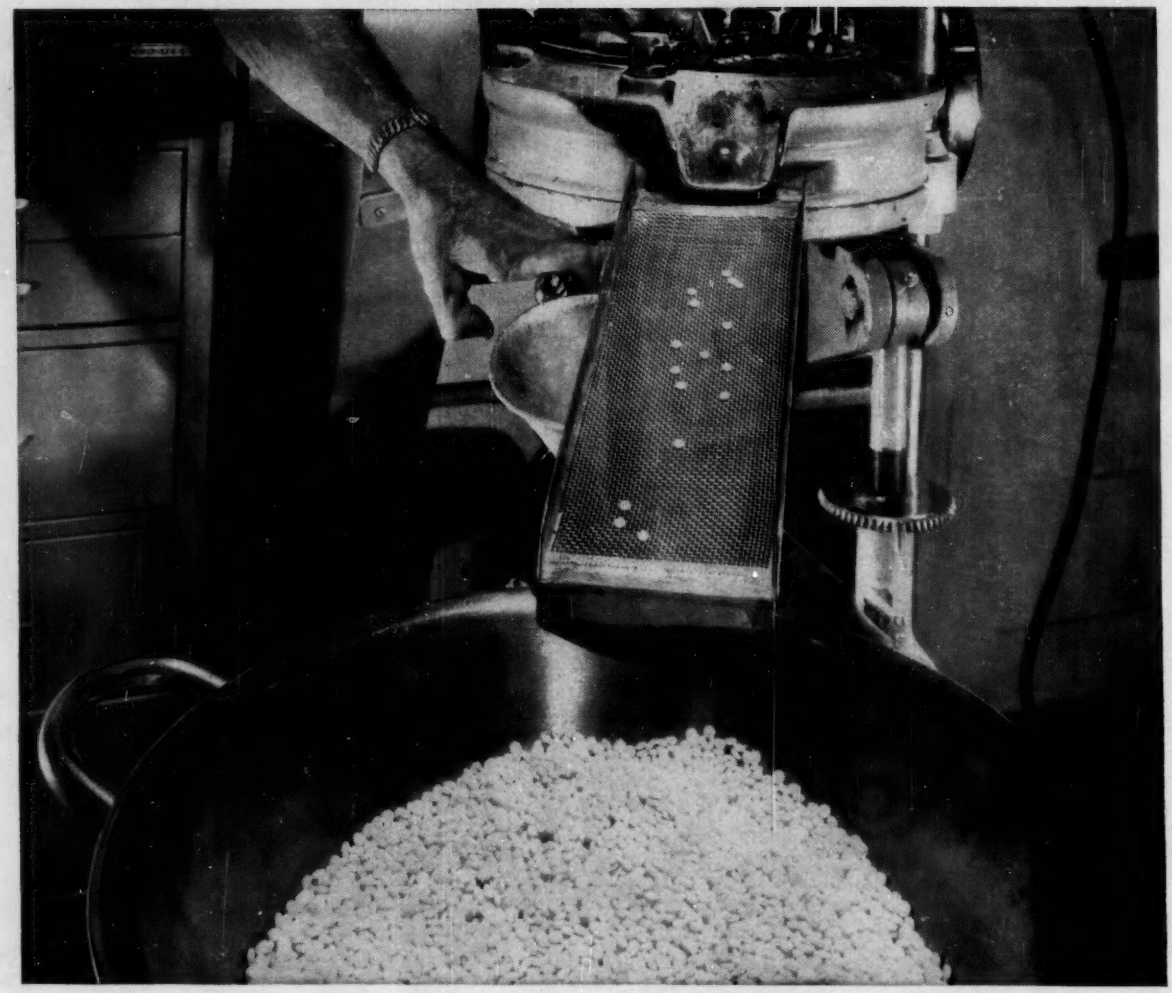

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A KEY IS CELLULOSE GUM

Abbott Laboratories, a leading supplier of drugs and pharmaceuticals, finds Hercules® Cellulose Gum an important ingredient in several of its formulations.

In Abbott's multi-vitamin tablets, Cellulose Gum serves as a disintegrator. Cellulose Gum attracts moisture in the digestive tract and helps the tablet disintegrate, releasing the vitamins into the system.

Hercules Cellulose Gum is of high purity (99.5+%) and uniform quality. Many manufacturers of medicinal preparations have found it to be a valuable addition to their formulations. For additional technical information or testing sample, just write Hercules outlining your proposed use.

Virginia Cellulose Department

HERCULES POWDER COMPANY

INCORPORATED

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VG56-2

FAIRCHILD AERIAL SURVEYS

COKING PLANT: Steel companies need more coke—and that means more chemical capacity.

Coal Chemicals Will Grow—But How Fast?

Steel producers probably won't get tax aid for an expansion of capacity beyond that which would be needed in case of war or other national emergency. That is the import of a cabinet decision made in Washington last week—a decision of prime importance to the chemical industry.

Few such government decisions are stated in so many words. And this one—since it has substantial political significance—was no exception. When the steel companies raised their prices following the steel strike, they made it quite clear that the increases they posted were not enough to give them money to cover construction of new plants. Thus, they felt they might have an advantageous trading position: if no special tax write-offs were granted, they could raise steel prices again—just before election day. And since the U.S. price level is a sensitive political subject to the Administration, steel companies felt they had a good chance of getting the fast write-offs they asked.

The $1.5 billion worth of plant expansion on which fast tax write-offs are asked includes facilities capable of yielding some 15 million gal./year of benzene—and correspondingly large amounts of toluene, xylene, naphthalene, tars and pitch.

Defense Mobilizer Arthur Flemming, instead of flatly turning down the request, reported that he would "not be in a position to make a decision on the establishment of expansion goals for the steel industry" until after some new figures are sent to his office by the Dept. of Defense. The figures are scheduled to be delivered between Dec. 25 and Jan. 15—well after the Nov. 6 election day.

Of course, the real question now is not whether such tax aid will be forthcoming, but whether companies will go ahead and expand anyway. It's obvious, of course, that steel firms will be expanding; there's a question whether they'll expand as fast as they otherwise might.

Expansion Listing: Of the several companies that have asked for tax write-offs on coke and coal chemical units, only one is fairly sure that it will go ahead without the write-offs. Most others, when queried by *CW*, said they haven't yet come to a decision. But if they do go ahead, the new production will be impressive.

U.S. Steel has asked for write-offs on $35 million worth of coke ovens at Gary, Ind.,—two batteries of ovens—and $19 million worth at Morrisville, Pa.

Kaiser Steel has asked a write-off on a $20-million expenditure at Fontana, Calif., for one battery of 90 new coke ovens.

Crucible estimated its cost for new coke ovens and a rolling mill in Midland, Pa., at $62,818,000. It's likely that the firm would install one battery.

McLouth Steel asked write-offs for $100,250,000 for pig ingots and coke ovens at Trenton, Mich. The company, conservatively, would install one battery of ovens.

Armco Steel asked write-offs on $254 million worth of new facilities at Ashland, Ky., and at Houston, Tex. At Houston, the company presently has 62 coke ovens, which produce 318,000 tons of coke per year. It would spend $11 million for 63 more ovens there—producing some 400,000 tons/year. Armco currently has no ovens at its Ashland plant, but would build 186 ovens to produce 1,108,000 tons/year of coke. Total cost of coke ovens and a by-product chemical plant would approximate $47 million.

Jones & Laughlin, which has considered a Houston iron and steel plant, would likely build at least one blast furnace and the accompanying battery of coke ovens and, perhaps, a chemical by-product unit.

In Prospect: Plan for Profit

The fast-growing chemical industry in Latin America may get new impetus from a venture capital corporation set up by the World Bank—the International Finance Corp.

IFC was officially christened and launched in Washington last fortnight when monetary experts from all parts of the world met for the 10th anniversary meeting of the International Monetary Fund and the World Bank itself. But the organization represents a substantial change from views that predominate in IMF and the World Bank: IFC is in business to stimulate international exchange of investments from private sources.

In contrast with the World Bank's role, which up to now has been to get member governments to invest in undeveloped areas of the world, IFC is strictly a private affair. It will make it easier for private investors to choose profitable foreign growth situations.

Here's how the new organization will work: Suppose a Brazilian chemical company wants to expand its operations. The company, through the Brazilian delegate to IFC, explains company plans and asks for help. IFC investigates the project—using World Bank staffers—then, if it is satisfied with the project's growth potential, IFC spreads the word to Wall Street or to American chemical companies that might be interested in investing.

If it finds a taker, IFC works out a joint deal, and, for itself, might buy convertible debentures of the Brazilian company. It could hold them until it is a success, then convert them into stock, which it could sell to interested buyers. Eventually, as IFC operations grow, public offerings of such equities will be considered.

The initiative for a project could come from an American investor—say a chemical company—that's looking for a sound place to put some money. It could ask IFC to let it know if there's a likely prospect.

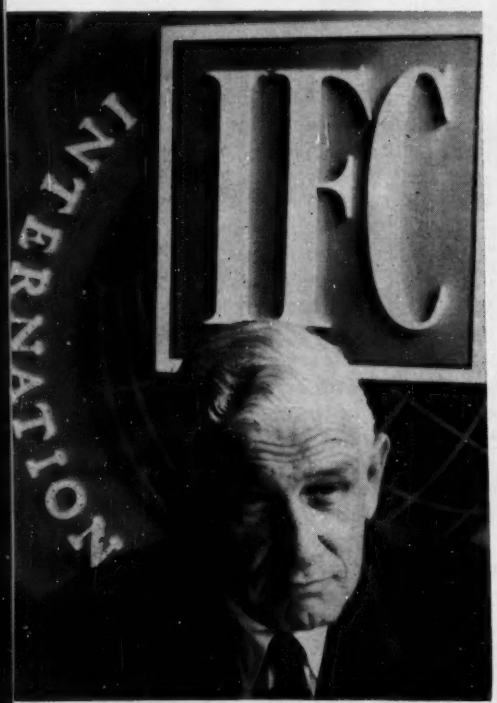
New Chief: Heading up the new division, which now has 20 member countries and expects more later, will be Robert L. Garner, former vice-president of the World Bank. Garner, an experienced Mississippi banker, told CHEMICAL WEEK that one of the chief goals of IFC's operation is to make money. Only in this way, says Garner, can IFC justify itself.

"This is not a philanthropic venture," Garner emphasizes. "It is an experiment in building up both the flow of private funds and new businesses. To do that, we've got to show that the basic idea is both sound and profitable."

It follows naturally, Garner thinks, that in financing a project, IFC will turn to countries where private capital is available—the U.S. and western Europe—for backing projects in areas that have a healthy growth climate—South America, for example.

Will IFC-aided companies compete with subsidiaries of U. S. firms overseas? Not to a great extent. If, for example, there are two producers of polyvinyl acetate in Argentina, IFC isn't likely to aid a third one to get started—unless the market will support as many as six.

At first, IFC will emphasize partnership with private investors, later take on projects by itself. It also will sell its holdings as quickly as possible.



ROBERT PHILLIPS—BLACK STAR

IFC'S GARNER: He's not looking for 300%.

Obviously, a company looking for such situations won't be happy with 5-10% profit. "But," stresses Garner, "we aren't looking for 300%." He would be well pleased with 50%.

"If there's any killing to be made," Garner adds, "we want private investors to get the benefit of that."

Push to Chemicals: The types of enterprises IFC is interested in are chemicals (one of the first industries it will consider), durable goods manufacturing ventures, metal- and mineral-processing plants. Later, when and if IFC builds its reserves beyond the $100 million it has to work with now, it will look into agriculture, retailing and other fields.

Garner points out that IFC has a hard, but not cold, heart. Though it is interested in profit and sound ventures, its over-all goal is to grow enough to aid business development in countries that need it most. In these areas, Garner strongly believes, "this is our best—and really, our only—answer to communism."

Garner, who left General Foods Corp. as vice-president and treasurer in 1947 to help set up the World Bank's lending procedure, is enthusiastic about IFC's future. He participated in planning of the new organization, and asked to head it. Garner believes IFC will stimulate business growth where it is needed most, and at the same time bring a good profit to those who are willing to share in the investment risk.

Lure of Uranium

The Atomic Energy Commission was pleased last week with the chemical industry's response to its call for companies to get into the business of supplying uranium salts for nuclear reactors—now exclusively a government operation.

Seven responses were made to the AEC request for proposals for 5-year contracts to supply uranium trioxide, uranium tetrafluoride, and uranium hexafluoride. Industry sources regard this as a high response. Only two potential suppliers are missing: Hercules Powder Co., and National Lead Co. The latter is operator of one of the AEC feed materials plants—at Fernald, Ohio.

The seven proposals received by the Oct. 1 deadline were from

Union Carbide Nuclear Co. division of Union Carbide and Carbon Corp.; Koppers Co. and Kennecott Copper Corp. (jointly); Dow Chemical Co.; Twentieth Century Materials Corp.; Climax Molybdenum Co. and Mallinckrodt Chemical Works (jointly); General Chemical Division (Allied Chemical & Dye); and Vitro Corp. of America.

One of these companies—Twentieth Century Materials—is a new firm organized in Denver, Colo., specifically to bid on the AEC proposal.

Officers in Twentieth Century are Sam Day, Fort Collins, Colo., a businessman prominent in oil and uranium mining, president; Robert Green, Denver banker, vice-president. The firm is described as having "substantial financial backing."

Three Months Work: AEC reports that evaluation of the proposals is expected to be completed about Jan. 1, 1957. In evaluating the proposals, the over-all cost to the government for procuring the desired uranium salts will, of course, be a prime consideration. Contracts will call for deliveries starting April 1, 1959, for quantities of uranium salts up to 5,000 tons (U_3O_8 equivalent) a year.

Industry sources speculate that this, assuming maximum contract quantities, could represent a gross dollar volume of $25 to $35 million a year.

Oxide, Too: AEC has modified its request to industry since its first announcement, in Oct. '55. It extended the deadline for proposals from Mar. 31 to Oct. 1 of this year, and also agreed to accept uranium trioxide in addition to the two other salts.

Originally, the trioxide was acceptable only on an interim basis pending completion of facilities to produce the fluorides.

Current Roster: In addition to National Lead's operation of an AEC-owned plant at Fernald, Mallinckrodt operates another AEC feed materials plant at St. Louis and will operate the abuilding Weldon Springs, Mo., plant. But where these plants are operated on a cost-plus basis, new facilities to be built will supply AEC on a straight contract basis (*CW, May 26, p. 17*). And a successful bidder will also be able to supply the private market for such materials, once it develops.

DIAMOND'S SARGENT: Through mullioned windows, a rosy view.

In Hand: Plan for Growth

Add acetylene to Diamond Alkali's mushrooming expansion plans.

Diamond President John Sargent last week said the firm would build an acetylene-from-natural-gas plant at Houston, Tex., in addition to the 200-tons/day chlorine expansion announced a week earlier.

The new acetylene plant reportedly will cost $10 million, have a capacity of 40 tons/day. Initially, acetylene will be used in making vinyl chloride monomer, along with by-product hydrochloric acid from chlorinated products operations, but the firm has further—but undisclosed—plans for using the acetylene.

To Grow By: In the recent past, Diamond has started a number of new expansions, including, in addition to those named, perchlorethylene, polyvinyl chloride, cement (1 million bbls./year), soda ash (30% more by 1960). All these are part of the company's $60-80 million, 4-year capital-expenditure program Sargent detailed last week to New York security analysts. Of this, the company will have spent $14 million by year-end, expects to lay out another $20 million in 1957.

What does this mean to Diamond? First, the company looks to a sales volume of $160-180 million by 1960, up considerably from January's forecast of $150 million (*CW, Jan. 21, p. 13*). Moreover, it speaks well of Diamond's divisional reorganization, begun a little over two years ago. The two newest divisions, Electro Chemical and Soda Products, plus the Chlorinated Products Division, will receive 78% of the already-committed expansion funds to be spent by 1960.

Sales Diversity: The company's sales to various end-use groups show virtually the same proportions going to each market as were going in '55 and '54. Only one of its dozen major market groups consumes more than 11% of total sales; that grouping—sales to other chemical firms—amounts to 22%.

How to Finance: Diamond intends to finance its expansion through 1960 purely from within. Sargent adds, however, that if expenditures do go as high as $80 million, "we may have to do some borrowing." As of now, however, the company estimates its yearly cash flow at $20 million; such a flow, maintained over the four years through '60, should enable it to meet its needs from within.

To Diamond Alkali management, the future looks rosy indeed. In mid-'55, for the first time since '44, the growth rate of net earnings (after preferred dividends) surpassed that of sales and capital assets. Now, says Sargent, the path is clear for the company's continued growth.

New Chief, Old Problems

NEW PRESIDENT of Virginia-Carolina Chemical Corp. is William H. Wilson, 40-year-old vice-president of New Orleans' Standard Fruit and Steamship Co.

He was chosen (*CW Business Newsletter, Oct. 6*) for the post by the management group that gained control of V-C two months ago.

Wilson takes over at a time when the company faces some substantial problems. Its sales have been off during the past few years, due, perhaps, to declining farm incomes reflected in sputtering demand for fertilizer—the company's chief product.

In addition, the firm's preferred stock dividends are in arrears some $73. (On this score, stockholders were told at the recent annual meeting that a committee of holders of preferred and common stock will be appointed to see if they can work out a solution agreeable to all shareholders.)

But, despite its problems, the management is optimistic about the future. Wilson plans a greater promotional effort, the disposal of unprofitable plants, the building of several new manufacturing units and a new research lab.

Wilson has held high positions in Illinois Tool Works and Johnson Wax Co., and has served with the management consulting firm, Booz Allen & Hamilton.

Bucking the Trend

California Spray-Chemical Corp. this week brought in a plant with which it hopes to buck a trend. The new plant is a $16-million fertilizer complex spread over 12 acres of its Richmond, Calif., location.

In entering fertilizer manufacture, it encounters the current weakness in fertilizer markets that has brought problems to companies such as Virginia-Carolina (*see story, at left*). Too, it's bucking a western U.S. trend toward such water-soluble fertilizers as ammonium phosphate.

But with the startup of operations on Tuesday, there was no doubt that this Standard Oil of California subsidiary was in the fertilizer business in a big way.

For about $12 million of the total plant cost, Socal bought its agricultural chemical subsidiary a basic position in ammonia (300 tons/day) and nitric acid (250 tons). A small amount of the production will be sold for industrial purposes by Oronite Chemical Co., another Socal company; one-third of the total will be converted into aqua ammonia; another portion will go to calcium and ammonium nitrate solutions and ammonium sulfate.

And though the remainder of its production will not be too large, on a tonnage-basis comparison, the success of Calspray's venture will rest largely on the record it makes in selling the 300 tons/day of pelleted, complex nitrogen phosphate fertilizers it can produce via the PEC process.

Open-Eyed Entry: Calspray didn't go ahead blindly with its plant. Back in '53, it set up evaluation programs at two universities to compare water- and acid-soluble fertilizers. (Conclusion: under certain alcarious soil conditions, water solubles may become less soluble in water than superphosphate.)

At the same time, it went into fertilizer marketing—using purchased materials—to see how profitable the business was, and to see how well such sales complemented its long-established pesticide market. Insecticide and fertilizer sales complemented each other well—Calspray is now the largest fertilizer distributor in California. Too, the company sees a big expansion ahead. Only 28% of cultivated land and 5-7% of range and pasture there receives enough fertilizer, the company says.

Operating Schedule: Calspray expects to have its complex operating at capacity by '59, and expects that, by then, fertilizer should account for more than 50% of its sales. Too, it wants a significant slice of fertilizer sales in the 11 Western states—which, by then, may amount to some $200 million a year. Such stakes certainly are worth a calculated risk taken like Calspray's.

Too, the plant will help give the West more chemical sufficiency. As Calspray President Art Mohr observed on Tuesday, "While there [is] sufficient Western production of one or two types of plant food, approximately one-third of the total plant food used is being imported from foreign countries or shipped long distances from the Middle West."

EXPANSION

Hydrogen: National Cylinder Gas Co. will expand its electrolytic hydrogen capacity at Kenosha, Wis., by 30% and that at Los Angeles, Calif., by 70%.

•

Pulp and Paper: St. Regis Paper Co. will build a 400-tons/day pulp and paper mill near the Kootenai River in western Montana. The site of the mill is on 200,000 acres of timberland owned by J. Neils Lumber Co. (Portland, Ore.), which St. Regis seeks to acquire (*see below*).

COMPANIES

Hydrometals, Inc. (formerly Illinois Zinc Co.), through its wholly owned subsidiary, Hayden Metals, Inc., has purchased the entire assets of Hayden Projects, Inc. Hydrometals will build a $5-million strip-copper producing plant in Chicago, which will use the chemical refining process developed by American Cyanamid Co.

•

Canadian Industries Ltd. has purchased William Stone Sons Ltd., a manufacturer of fertilizer and other agricultural products. The firm will operate in CIL's agricultural chemicals division.

•

St. Regis Paper Co., as part of its expansion program, is proposing to acquire the assets of J. Neils Lumber

Washington Angles »

» **A plant of potential defense value** won't be dismantled, now that the U.S. Army Chemical Corps and the Canadian government have come to terms. Involved: a Canadian government-owned plant at Shawinigan Falls, Que., that makes hexachlorethane—used in chemical smokes. The plant, which was to be cannibalized, will be kept in stand-by by the Canadian government, now that the Chemical Corps has agreed to guarantee a U.S. market for the material in case of mobilization.

The Chemical Corps' own mothballed hexachlorethane plant in Natrium, W. Va., is too large for economic operation except in full-scale emergencies. The Canadian unit is just right for possible "brushfire" wars.

The agreement marks a "first"—never has such a guarantee been given to a plant outside the U.S. proper.

» **Interested in uranium contained in lignite?** New rules, just drafted by the Interior Dept.'s Bureau of Land Management, clarify rights to uranium or other minerals found combined with lignite on public lands leased out to private parties.

The rules implement a law, passed by Congress earlier this year, giving precedence (over mineral rights lessees) to lignite and coal lessees.

» **Competitive-with-industry salary levels** for government scientists may be ahead. The White House is now drafting a bill that would give federal agency heads the power to set pay scales at a level competitive with those of industry for scientists, engineers and other hard-to-hire people.

The current liberalization of civil service rules—which gives chemists, for example, top salary in their pay brackets—hasn't been enough to help government hiring.

Not only is industry taking most of the new college graduates, say agency recruiters, but it's depleting current agency staffs as well.

» **A five-time boost in exports of Salk vaccine** is ahead for '56's fourth quarter. The Commerce Dept. has set a 7-million-cc. export quota for the three-month period. Some 35 countries may ask for supplies.

Canada will be a big consumer. It has just okayed an application from Eli Lilly's Canadian subsidiary to import the material.

» **The 150 chemical additives** that the Food and Drug Administration feels haven't been adequately tested (CW, Sept. 29, p. 24) are mainly flavors—both synthetics and essential oils. FDA is conducting its own tests—but doesn't expect to come up with many immediate test results.

There's a second group of 100 materials—including pepper, chicory and vanillin—that it feels aren't well enough tested. But the agency isn't especially worried about these.

Co. on a stock exchange basis, involving 2½ shares of St. Regis for 1 share of Neils common. At present stock market quotations, the transaction involves $36.5 million.

•

Flintkote Co. has acquired the assets of U.S. Lime Products Corp. through a cash purchase of 98% of the corporation's stock.

•

Houston Natural Gas Co. shareholders have approved a proposal to sell 300,000 shares of a new class of $100-par preferred stock in order to finance acquisition of Houston Pipe Line Co. from Atlantic Refining Co. Houston Natural would pay about $38.5 million for the pipeline company.

•

Brush Beryllium Co.'s public offering of 375,000 shares of $10-par common stock has been oversubscribed. Proceeds from the sale will be used to finance construction of a new plant at Elmore, O., which will supply the government with beryllium under a contract with the Atomic Energy Commission.

•

Johns-Manville Corp. is offering subscription rights to share-owners for 648,696 shares of common stock at $40 each, on the basis of 1 new share for each 10 held. The $26 million of proceeds will be used for plant expansion and working capital needs.

FOREIGN

Pharmaceuticals/Brazil: Parke, Davis & Co., is blueprinting a $1.5-million expansion program for its pharmaceutical manufacturing plant in Rio de Janeiro. Five new structures are planned, with construction scheduled to get under way later this year.

•

Tax Refund/South Africa: Importers of certain resin chemicals will be allowed a 10% refund on South African import duties. Those listed are: toluene, vinyl acetate monomer, polyvinyl alcohol, tricresyl phosphate and dibutyl phthalate.

•

BASF/England: The German firm Badische Anilin has formed a British subsidiary, capitalized at $8,400. The new firm will give economic and technical advice to chemical firms.

•

Fertilizer/Pakistan: Two Italian firms, Montecatini and An-Saldo, plan to build a $35.7-million nitrogenous fertilizer plant at Multan, western Pakistan. The U.S. government has advanced $200,000 to help meet costs. Production target: 100,000 tons/year.

•

Rayon/India: The Indian Rayon Corp., recently formed by a group of Bombay industrialists, will set up a rayon plant to produce 10 tons of rayon and 10 tons of staple fiber daily. IRC hopes to raise about $2.6 million through a public subscription this November, with an equal amount to be subscribed by the promoters.

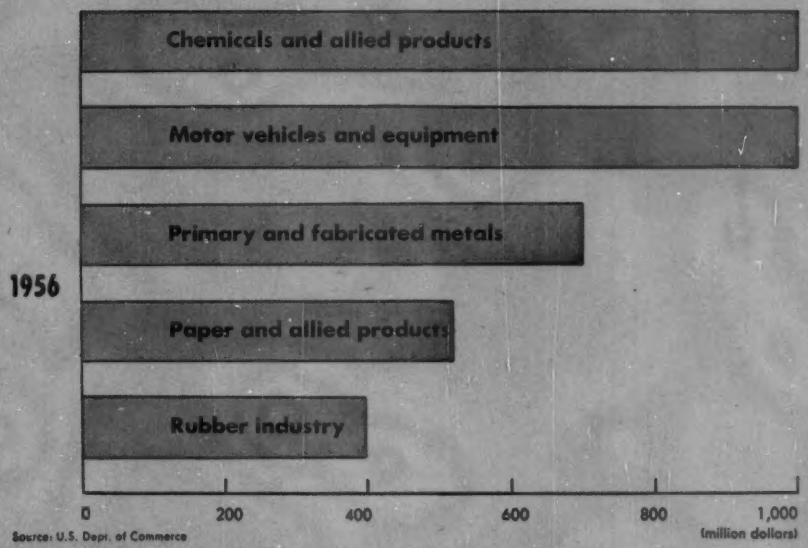
Our sweet laborers have finished the task of preparing the address labels. By now "Eastman Organic Chemicals, List No. 40" should have reached all who have in years past indited a desire to keep receiving each new edition of the catalog of the 3500-odd reagents and other organic compounds quickly available in laboratory quantities from a single source of known integrity. Others who want the new catalog should address ***Distillation Products Industries,*** Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company).

Charting Business

CHEMICAL WEEK
October 13, 1956

CHEMICALS TIE FOR FIRST . . .

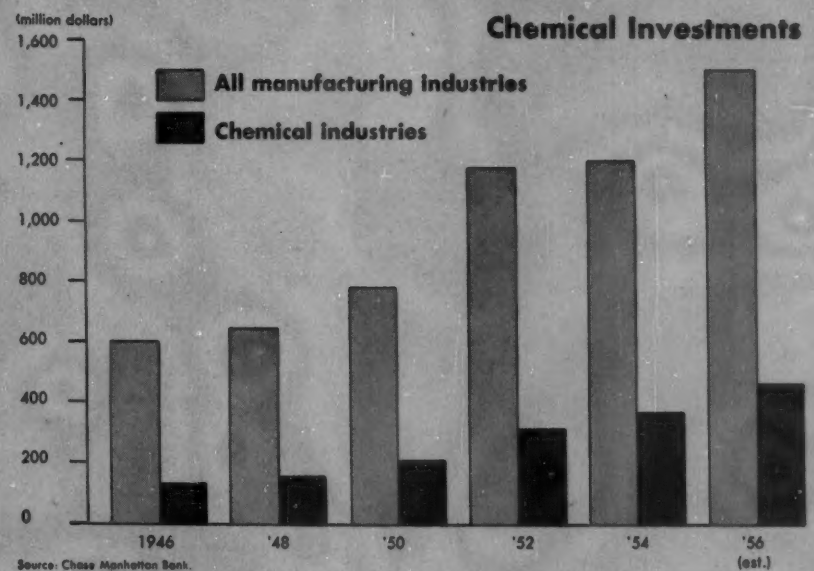
In private U. S. foreign investments.



Source: U.S. Dept. of Commerce

THE BULK GOES SOUTH . . .

Latin America Gets Nearly 50% of U. S. Foreign Chemical Investments



Source: Chase Manhattan Bank.

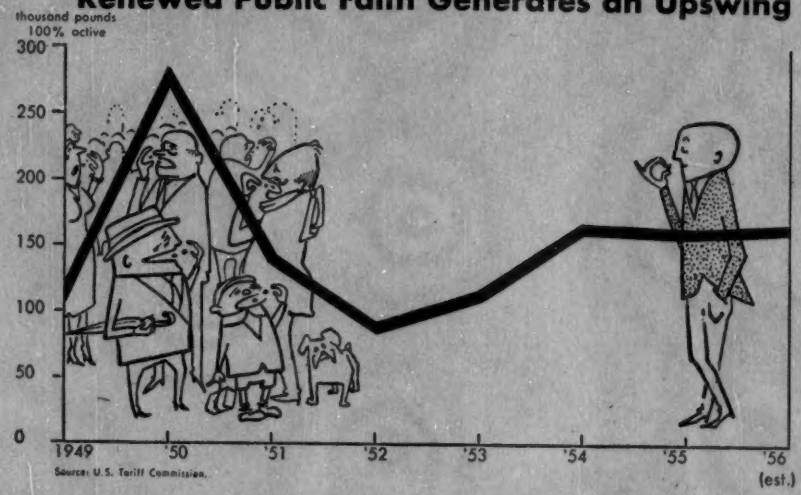
PRIVATE U.S. investments abroad continue to grow at a rapid rate. This year's expenditures, for instance, will score more than a $3-billion gain over '54's $26.6 billion. The largest share is earmarked for the chemical field. The U.S. is pouring about a billion dollars into foreign chemical and allied ventures this year, and this rate of investment is expected to continue. Latin America, because of its growing industrialization, is now attracting nearly one-half of all funds that are invested in foreign chemical industries by private U.S. investors.

Charting Business

(Continued)

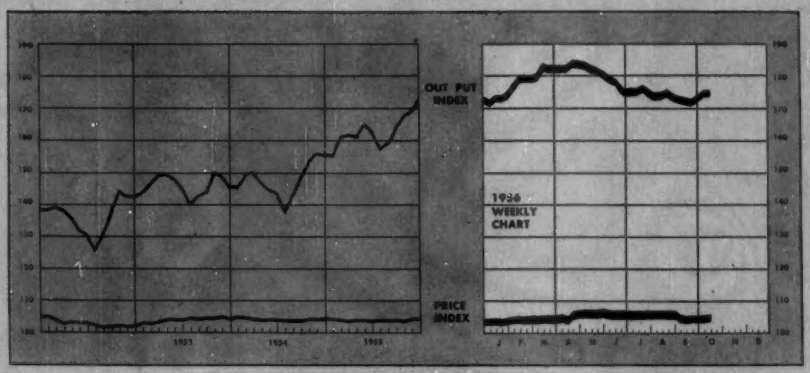
ANTIHISTAMINE PRODUCTION

Renewed Public Faith Generates an Upswing



ANTIHISTAMINE production is making a strong comeback. By the end of this year, production will hit some 165,000 lbs.—nearly 15,000 lbs. more than last year. After some producers touted antihistamines as the "cure-all" for colds and allergies in '49, output registered a gain of nearly 100% by the end of '50. But by '52, the drugs had lost some of their attraction. Now, production is up again—more judicious application of antihistamines (in various cold preparations and other ethical medications) is more than rewinning lost ground.

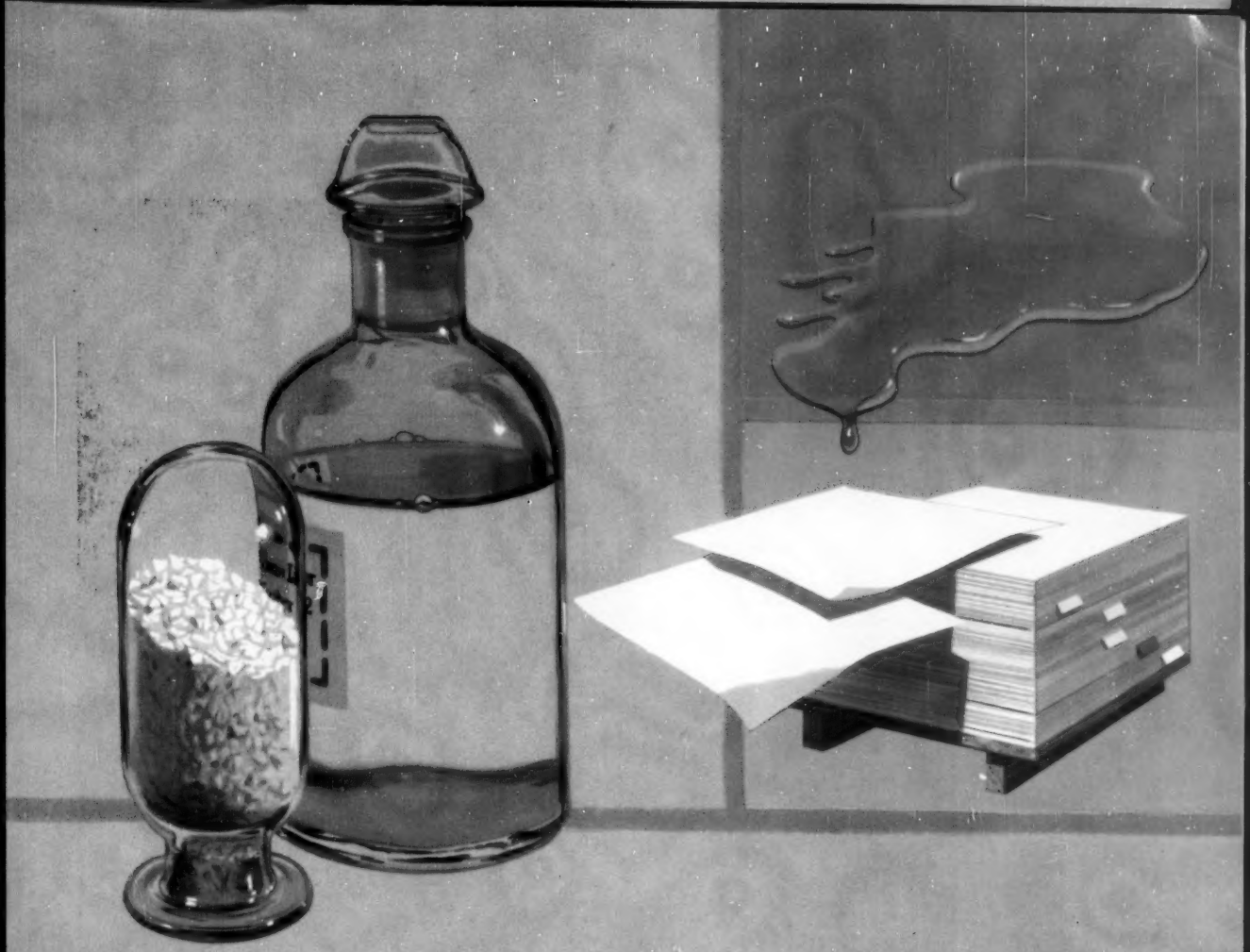
BUSINESS INDICATORS



WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	176.3	175.1	166.7
Chemical Week Wholesale Price Index (1947=100)	105.6	105.5	104.5
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	442.2	440.9	448.2

MONTHLY

Foreign Trade (million dollars)	Exports			Imports		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	103.4	114.5	86.7	19.1	18.9	17.6
Coal-tar products	6.8	8.1	5.7	5.7	4.1	3.7
Industrial chemicals	17.7	16.5	11.5	7.2	7.1	6.2



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US RUBBER **Mechanical Goods Division**

United States Rubber

IN QUICK ASSETS RATIOS, PROCESS INDUSTRIES RETAIN HIGH RANKINGS

(Dollar figures in millions)

Industry Group	As of March 31, '55 Liquid Assets	Current Liabilities	Quick Assets Ratio	As of March 31, '56 Liquid Assets	Current Liabilities	Quick Assets Ratio
Petroleum refining	$5,549	$3,124	1.78	$5,806	$3,205	1.81
Paper and allied products	1,963	1,125	1.74	2,149	1,260	1.71
Chemicals and allied products	4,563	2,745	1.66	4,944	3,050	1.62
Nonferrous metals	1,686	1,049	1.61	2,065	1,291	1.60
Rubber products	1,198	789	1.52	1,276	863	1.48
ALL MANUFACTURING (except newspapers)	52,533	38,832	1.35	56,196	43,486	1.29

AMONG PROCESS COMPANIES, WIDE VARIATIONS IN LIQUIDITY

(Dollar figures in millions)

Company	As of Dec. 31, '54 Liquid Assets*	Current Liabilities	Quick Assets Ratio	As of Dec. 31 '55 Liquid Assets*	Current Liabilities	Quick Assets Ratio
Air Reduction	$30.9	$16.0	1.92	$41.3	21.9	1.88
American Potash	5.2	3.3	1.57	11.6	5.3	2.17
Du Pont	470.1	124.9	3.77	496.6	141.6	3.50
Food Machinery	58.0	42.3	1.37	55.4	43.9	1.26
Mallinckrodt	6.2	2.4	2.54	9.2	3.5	2.64
National Lead	106.1	74.0	1.44	118.8	83.6	1.42
Olin Mathieson	103.3	55.1	1.88	121.8	65.9	1.85
Pitts. Plate Glass	119.2	72.8	1.64	186.5	111.0	1.68
Stauffer	17.8	6.3	2.82	32.8	14.5	2.25
Vick	16.4	5.0	3.30	18.6	5.0	3.70
10 PROCESS COMPANIES	933.1	404.0	2.31	1,092.4	496.2	2.20

*While NICB's industry-by-industry data in the upper table do not include non-U.S. government securities in liquid assets, the lower table based on company statements includes in liquid assets what the companies list as "other marketable securities."

In Debt-Paying Power, Ahead of the Pack

CASH RATIOS: 4 UP, 6 DOWN

(Ratio of cash to current liabilities)

Company	Dec. 31, '54	Dec. 31, '55
Air Reduction	0.55	0.39
American Potash	0.80	0.76
Du Pont	0.85	0.97
Food Machinery	0.61	0.40
Mallinckrodt	0.69	1.29
National Lead	0.50	0.55
Olin Mathieson	0.84	0.71
Pitts. Plate Glass	0.53	0.31
Stauffer	1.04	0.68
Vick	0.85	0.87
10 PROCESS COMPANIES	0.68	0.56

Traditionally well prepared to pay bills promptly, chemical process companies continue to rank near the top among U.S. manufacturing industries in quick assets ratios.

Because of recent expansion projects, many companies' "current liabilities" during the past year have risen at a slightly steeper rate than "current assets." This cuts the quick assets ratio somewhat, but—as computed by National Industrial Conference Board (*top table*)—processors as a group are still far above the all-manufacturing average. And in cash ratio, chemical firms generally are well above the 0.20 "safe" level.

WHILE JAPAN'S PRODUCTION OF THESE ELECTROCHEMICALS GOES UP . . .

(in pounds)

	1952	1953	1954	1955
Ammonium sulfate	4,092,253	4,257,849	4,564,232	4,683,675
Caustic soda	608,423	843,693	1,009,043	1,137,704
Carbide and calcium cyanamide	1,309,772	1,311,640	1,260,043	1,483,071
Aluminum	92,308	104,687	120,996	130,541
Ferroalloys	265,195	331,604	230,435	493,632
Electrolytic copper	207,684	200,321	233,278	249,295
Electrolytic lead	40,682	49,113	67,789	81,668
Electrolytic zinc	108,552	121,469	152,108	159,885
Electric Power consumed in production of the above chemicals (in billion kwh.):	8.7	9.5	10.5	12.0

New Power for Japan's Electrochemicals

U.S. electrochemical exports to Japan are on the wane, slashed by an expanding Japanese electrochemical industry that appears to be limited only by the country's export markets.

Counted on heavily for rapid postwar development by both government and business, Japan's electrochemical industry has received special considerations from both quarters. Primary assistance for electrochemicals—as for other industries—has been in the form of cheaper electric power furnished by government-subsidized hydroelectric projects.

The result has been outstanding growth for both the electrochemical and hydroelectric industries, although the latter is now faced with an unexpected obstacle. The block: construction expenses that have steadily increased until they are almost equal to those of thermal power plants. Electric power production costs are also on the increase.

Growth Despite Costs: In spite of rising costs, industrial use of power in Japan has continued to grow—amounting to 66.6% of the country's total power consumption. The main electrochemical companies use 31% of the industrial power—indicating the amount of activity in the industry. Domestic demand for such electrochemical products as chemical fertilizers, ferroalloys, aluminum and sodium has already been met.

Japan—richly endowed with mountains and abundant rainfall—already has more hydraulic power per unit of area than any other country in the world, and more capacity is under way. The expected result: more than sufficient electric power for all Japan's industrial needs.

Much is expected from the recently completed Sakuma Dam, with its 350,000-kw. capacity, and the seven Tadami River dams, with a total capacity of 1.2 million kw. Four dams in the latter project are in operation. There is also the Tagokura Dam, which will provide 380,000 kw. in four years, and the proposed Okutadami Dam—also on the Tadami River—which will deliver 400,000 kw. The Japanese expect the present phase of power development to be completed in the next five years. During this period, demand for electricity is expected to increase 6-8% yearly. Electrochemical production cannot be expected to keep pace with this expansion, however, since any production increase at this point would have to be exported.

The Next Five Years: During the next five years, a yearly increase in ammonium sulfate exports of 100,000-200,000 tons is expected. At present, 1.6 million tons are consumed domestically, and 500,000 tons are exported. No increase is expected in the production of calcium cyanamide, since export demand is small, but the production of raw cotton and wool substitutes—synthetic fibers, vinyl acetate and cellulose acetate—will be increased as import funds for the natural substance are cut.

Output of ferroalloys and aluminum are also expected to rise—depending primarily on the trend in the world market. Increased electric power will be used primarily for the production of

SAKUMA DAM: From abundant resources

IMPORTS OF THESE U.S. HEMICALS GO DOWN

ustic Soda (pounds):

1954	1955	1956 (1st half)
14,300	50,000	0
ued at	valued at	
7,500	$2,735	0

rroalloys (pounds):

66,824	45,340	33,046
ued at	valued at	valued at
34,736	$2,441	$32,575*

h valuation with respect to volume is due to a shift toward er quantities of very high-priced alloys.

ammonium sulfate, vinyl chloride and synthetic fibers.

In spite of high production costs, Japan's growing hydroelectric power industry is providing ample power for electrochemical growth. Only the strength of Japan's export market can be expected to dictate electrochemical production. For U.S. electrochemical exporters, the Japanese market seems destined to slip slowly from their grasp, possibly disappearing altogether.

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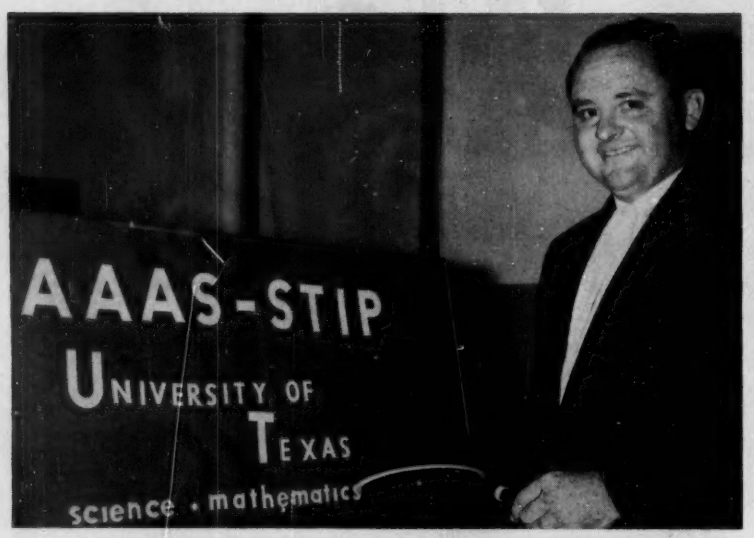

TEXAS' TAYLOR*: To meet local industry's 'brainpower' needs, he spurs a . . .

7-Pronged Drive for Pupils

Can Texas—where chemical process industry expansion has been setting the pace for the entire nation—turn out enough home-grown scientists and engineers to meet the growing needs of those native industries?

Despite the incentive of having so many good job opportunities right in their own back yard, Texas young people have been hot and cold about technology in their colleges during the past few years (*see table, right*). Now, a move is afoot—particularly at the University of Texas—to start a long-range build-up in enrollment in science and engineering classes.

This, of course, is only a part of the over-all picture of the anticipated shortage of engineers and scientists. But it's an important part, because of this state's high ranking in chemical processing, in total population, and in number and size of accredited colleges. Two other factors: Texans' traditional pride in self-sufficiency, and the desire on the part of industry management in Texas to use "native son" Texans to a considerable extent in filling technical positions there.

'Conditioning' Cited: At four large chemical plants along the Texas Gulf Coast, *CW* finds that more than 52% of the 740 degree-holders in technical and scientific positions are Texans. Among reasons cited by the plant managers for this preference:

- "We like Texans because they adapt themselves easily."
- "Texans are better conditioned to this locality and tend to be more contented here."
- "A basic reason for this predominance of Texans is in our [policy of] local hiring."
- "In graduates of Texas schools, we are a little more familiar with the product we're getting; and they seem to have a greater community interest because they are interested in Texas."

Nevertheless, all four managers make it clear that they still want an inflow of scientific and engineering employees from other parts of the U.S.

Seven Plans, One Goal: Reasoning that one way to help improve the whole country's scientific manpower position would be to boost its own student throughput to keep pace with local industry's growth rate, University of Texas officials are pressing these diverse tactics:

- Last week, on its Austin campus, UT conducted its third annual conference for the advancement of science teaching, attended by some 600 teachers and administrators from Texas schools and colleges.
- Each summer, UT's Science-Math Teaching Center offers special advanced science seminar courses for high school instructors.
- Starting this fall, UT—in cooperation with the American Assn. for the Advancement of Science—is sending out consultants to help high school science teachers in the area.
- For high school undergraduates who've shown special aptitude in science, UT has launched a series of six-week "enrichment courses" that began last summer with 24 boys and 4 girls studying chemistry.
- UT science teachers are urging gifted students to go into high school science teaching.
- Next week, UT will begin an annual chemical engineering lecture series—open to the public.
- In addition, UT is trying to set up a program of intensive graduate study for science teachers; is seeking Atomic Energy Commission approval for a $100,000 experimental nuclear reactor; and also—in partnership with Rice Institute and Texas A&M—is out to get a $25-million nuclear reactor laboratory for the state.

In other states, industry executives and educators will be watching to see whether UT's extensive plans hold the key to the nation's science and engineering manpower problem.

*Associate Professor Wayne Taylor of Texas University's Extension Teaching and Field Service Bureau, who helped draft science teaching improvement program for American Assn. for Advancement of Science.

DEMAND UP, BUT OUTPUT ZIGZAGS

(Number of B.S. degrees in chemical engineering granted by three leading Texas colleges*)

Year	B.S./Ch.E. Degrees
1946	48
1951	116
1952	83
1953	108
1954	92
1955	62
1956	109

*University of Texas, Rice Institute and Texas A&M.

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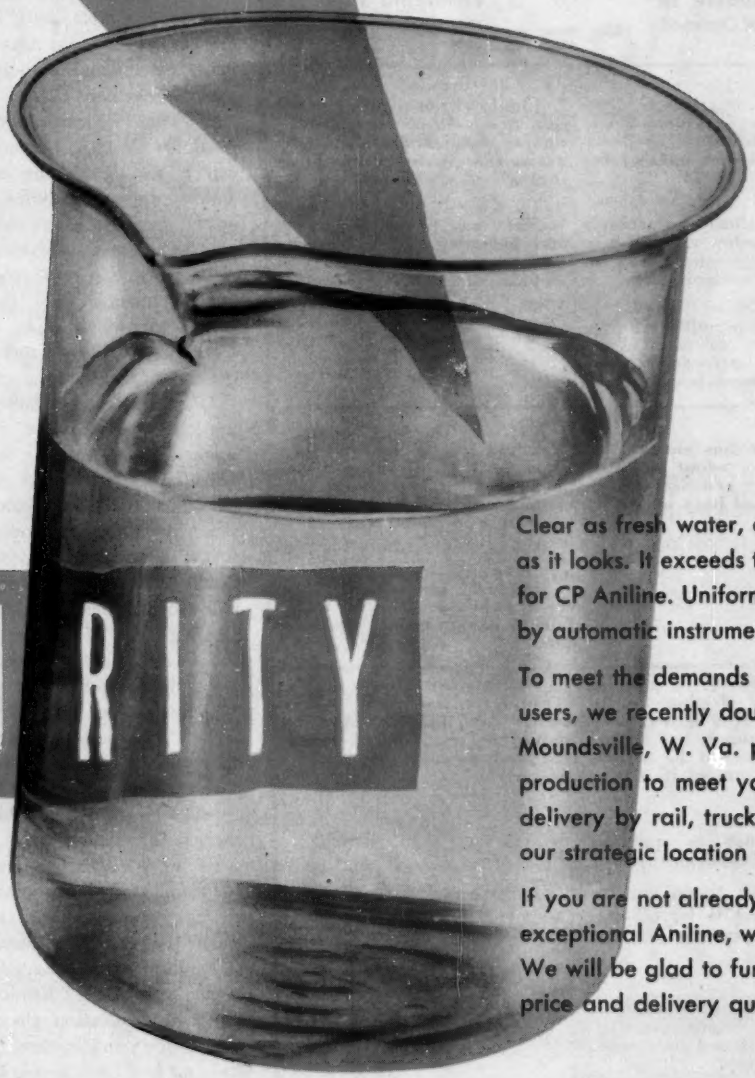

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Labor Law Landmarks: Where's the 'Bias'?

(Breakdown of principal 1956 decisions in labor-management cases significant to chemical process industries)

Agency making decision	Favorable to labor unions	Favorable to management
U.S. Supreme Court	• Employees on strike in disregard of no-strike clause retain protected status if strike is because of employer's unfair labor practice. • Union's failure to comply with Taft-Hartley doesn't give state power to stop peaceful picketing for recognition. • Federal law permitting union-shop contracts in railroad industry takes precedence over state right-to-work laws.	• Employer not required to permit union organizers to electioneer on plant premises if the union can reach the employees through other channels. • State has power to prevent mass-picketing violence directed at interstate employer, even though federal law involved.
U.S. Circuit Courts of Appeals	• After strike has ended, employer may not adopt new seniority policy penalizing employees who had been on strike.	• Employer justified in discharging for disloyalty an engineer who set up "manpower conference" to help other employees find jobs with other firms. • Employer not bound to disclose financial data if union fails to demonstrate a need for data.
National Labor Relations Board	• Petition for election not to be denied on ground that petitioning organization has agreed that employees will be assigned to affiliated unions if it wins the election. • Employer not to question employees or applicants about union status. • Employer not to lay off employees for suspected union activity. • Union's certification in effect for one year, despite majority of employees' signed statements repudiating union. • Employer not to assign employee to attend union meetings and report back information. • Employer not to grant unilateral wage increase during negotiations without consulting union.	• Employer has right to discharge for disloyalty striking employees who publicly charge that products made during strike are inferior.

If the chemical labor unions fare as well in upcoming actions as they've done so far this year, it may be hard for them to substantiate their charges that they've had to buck an "antilabor bias" in federal proceedings.

CW's summary of major 1956 decisions (*see table, left*), indicates that in this industry, at least, the unions have been winning more cases than has management. This has been especially true in cases decided by the National Labor Relations Board, which has borne the brunt of the unions' current criticism. (In addition to the decisions listed, there were four that were not exclusively favorable to either side: one on employer's disclosure of financial data, two on appropriate bargaining units, and one on Communist party membership as grounds for discharge.)

OCAW Merger Challenged: Leading chemical cases on federal court dockets this month include Olin Mathieson's appeal to the Supreme Court from a ruling against a "super-seniority policy" adopted after a strike; a court of appeals action in which Union Carbide's National Carbon Co. Division is challenging the 1955 merger of CIO's Oil Workers and Gas, Coke & Chemical Workers; and a district court case over whether NLRB has the power to put wage-earners into a bargaining unit made up predominately of professional employees. In addition, OCAW may appeal the NLRB decision on discharge for disloyalty.

Facing NLRB's five-man board are 10 disputes from process plants. In six cases one or more unions—primarily the AFL-CIO Teamsters—want recognition as sole bargaining agent; in one case, Dow Chemical is asking for a decertification election at Bay City, Mich.; and in three cases, management has been accused by various unions of having committed unfair labor practices. Both NLRB and the Interstate Commerce Commission are holding hearings on the Teamster union's alleged secondary boycotts.

Unless the Taft-Hartley Act is overhauled by the next Congress, cases like these will provide the major opportunity next year for any "refining" of the nation's basic labor law.

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ADMINISTRATION

New Foe to Tariffs

"Tariff protection has only marginal significance" for the U.S. chemical industry, according to Percy Bidwell in his new book on the tariff and American industry*.

Bidwell—research associate for the Council on Foreign Relations, and former director of studies for the organization—has attempted to make the problems of import trade "interesting and intelligible to a wide audience" in a book that represents more than two years of plant tours, interviews and private meetings with company executives and government officials, and collaboration with numerous executives from the industries discussed.

In presenting this eight-industry cross section of the tariff problem, the author has elected to devote a chapter to the synthetic organic chemical industry.

Not for the Specialist: The book is admittedly not for the specialist, and Bidwell begins his chapter on chemicals with a basic review of the U. S. chemical industry—its size, products, natural divisions, growth and potential, and its tariff history. He then examines the various factors that weigh on the question of tariffs: the amounts and kinds of competition, the question of cheap foreign labor, batch vs. continuous-process manufacturing, sources of foreign competition, the role of U.S. chemicals in war, defense essentiality, and the interrelation of American and foreign firms. In each instance, Bidwell tries to examine all sides of the question at hand, attempting to place these factors in their true perspective. The result is a picture of the many factors involved, and the realization that "the effects of tariff change spread far beyond the industries immediately affected and the communities in which they are situated."

Of Negligible Significance: The author concludes that the chemical industry is one of three (of the eight examined) for which the tariff has negligible significance, and adds that often—when protection is needed—tariffs may not provide the best solution.

Bidwell offers no cure-all, seeks to present the central issues thoroughly and impartially. He has—as he set out to do—shown that many problems are intertwined in the tariff question. It's difficult to estimate the net effect the book will have on those who influence tariff policy. Its careful documentation and the author's conclusions against a high protective tariff for the chemical industry may well prove a convincing argument for some, arouse opposition in others.

*"What The Tariff Means To American Industries," by Percy W. Bidwell; Harper & Brothers, 1956; 304 pp.; $5.

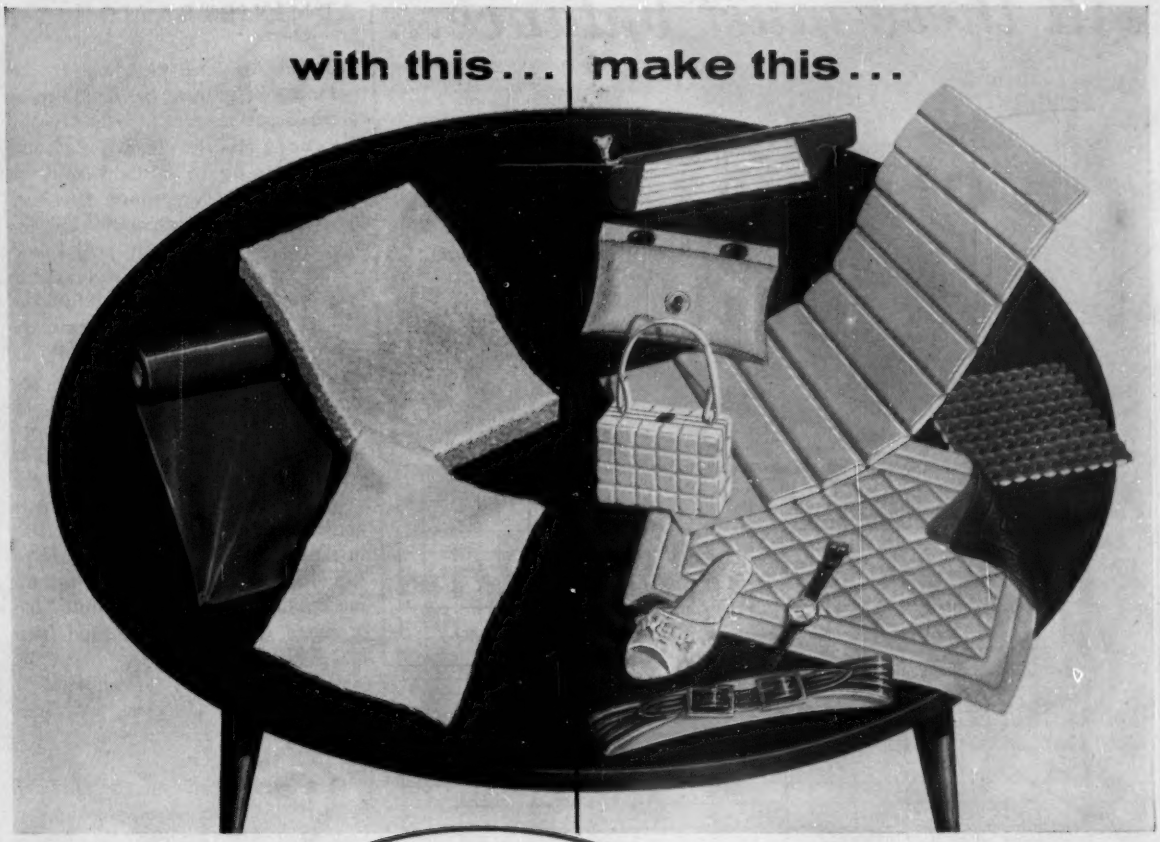
LEGAL

Proposed Tax Law Changes: If things go well, management can look forward to Congressional action that would bring accounting for tax purposes into closer conformity with accounting for financial purposes, along with a host of other changes designed to simplify the income tax law. Such are the recommendations of the committee on federal taxation of the American Institute of Accountants—whose previous recommendations helped shape the 1954 tax revision law and regulations.

The group has submitted a list of 262 recommendations for changes in the income tax law to Sen. Harry Byrd (D., Va.), chairman of the Congressional Joint Committee on Internal Revenue Taxation, with the warning that year-to-year plugging of loopholes in the law endangers public confidence in the nation's tax structure.

Among the recommendations was

SENATOR BYRD: Toward elimination of loophole plugging.



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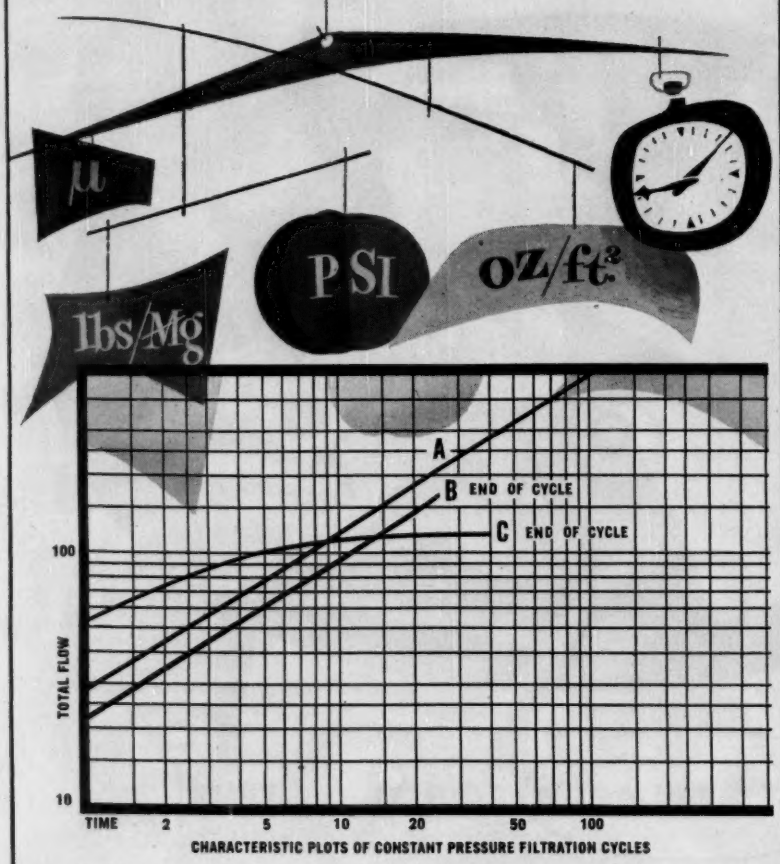

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one that suggested closely held corporations be granted the option to be taxed as partnerships. Another recommendation is the removal of the present tax on 15% of dividends received by one corporation from another. Since the corporation paying the dividend has already paid a corporate income tax, and distribution to individual stockholders will be subject to tax, the committee believes the intercorporate dividend should not be taxed.

AIA Committee Chairman J. S. Seidman, CPA—who sent the recommendations to the Treasury Dept. as well as to Senator Byrd—said the proposed changes would "eliminate many imperfections and uncertainties" in the existing code. It's too early to speculate on the fate of the recommendations, but the institute has promised to press for "a good hard look" at what can be done about the "increasing complexity of our tax laws, and its numerous special provisions and inequities."

•

Fertilizer Advertising: The fertilizer industry has been served warning by Federal Trade Commissioner Sigurd Anderson to expect a close check on its advertising.

Acknowledging what he called "a clean advertising record" for the industry, Anderson told the New Jersey Fertilizer Conference: "FTC has shown considerable interest in the fertilizer industry and its allied branches." He added that since FTC was set up in 1915, 19 complaints have been brought against members of the industry, and another 19 stipulations have been obtained. "In connection with the complaints," he said, "orders to cease and desist were taken against nine of the 19 respondents complained against, seven cases were dismissed, and three complaints are pending." Anderson called for exercise of "a greater protecting force" than FTC—the "advertising conscience" of the producer.

The commissioner's careful manner of explaining the way in which complaints can be received from "any person who feels a businessman is guilty of unfair methods of competition and unfair or deceptive acts" indicates that FTC plans an even closer scrutiny of fertilizer activities in the future.

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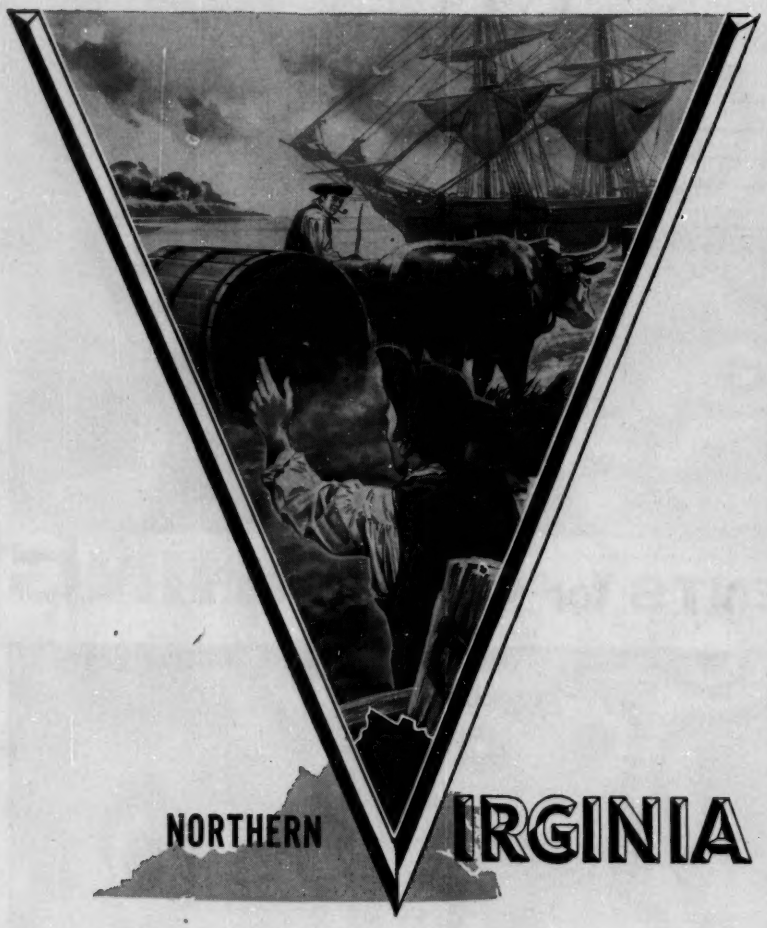

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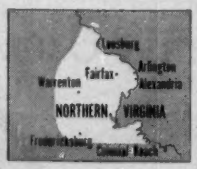

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ADMINISTRATION

WIDE WORLD

GOVERNOR RIBICOFF: In Connecticut, a fight over 'right-to-work'?

LABOR

At 'Point of Gun': Connecticut's Gov. Abraham Ribicoff is in the middle of a fracas that's developing in that state over "right-to-work" issues. His administration's State Board of Mediation and Arbitration recently reported that Connecticut industrialists appeared to be dropping their opposition to union-shop clauses; and this stirred the Manufacturers Assn. of Connecticut to send the governor a vigorous protest.

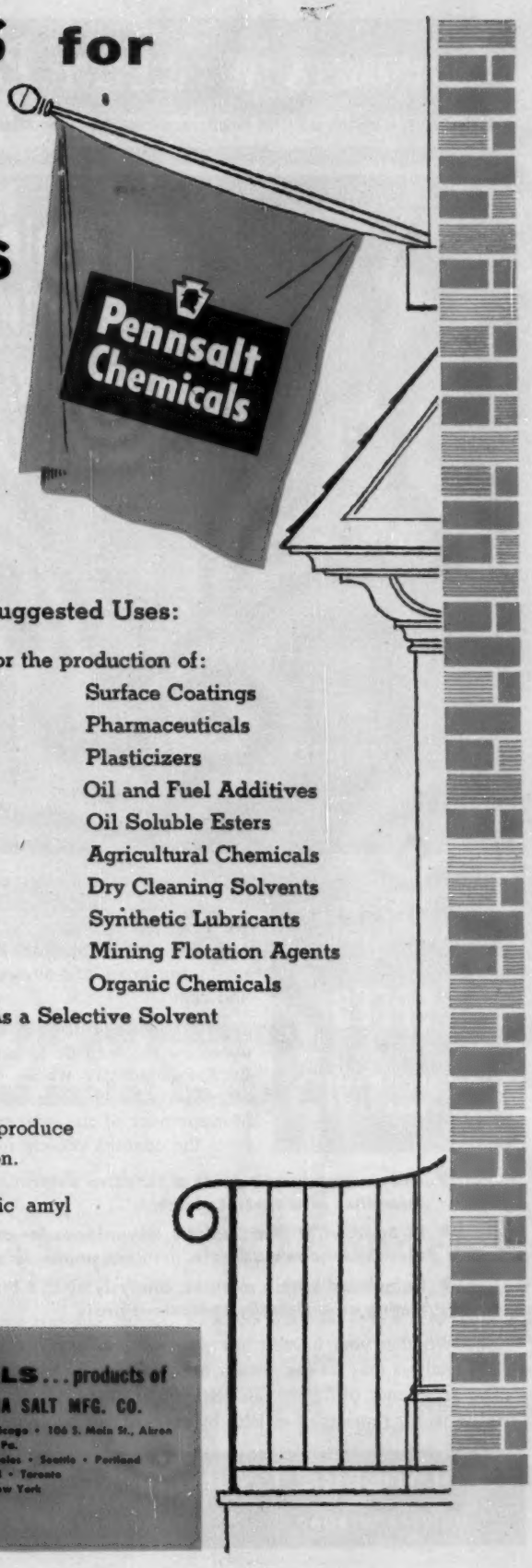
A number of union-shop agreements have been signed during the past year, the association concedes, but it insists that management signed "at the point of a gun." The association is now planning to try to get the 1957 legislature to adopt a law prohibiting the union shop.

•

Wages Up in Canada: One 12% wage increase and a strike for higher wages and fringe benefits—both at Shawinigan Falls, Que.—indicate the trend toward rising labor costs in Canada's chemical industry. The 12% settlement includes a 5% boost effective this week as the work week is sliced from 42 hours to 40.

Throughout Canada, average weekly earnings of hourly paid chemical workers rose from $62.90 as of July 1, '55, to $65.20 last July 1. By comparison, average weekly earnings of U.S. chemical workers rose from $83.22 to $87.13 in the same period.

HEADQUARTERS for 'SHARPLES' Brand SYNTHETIC AMYL ALCOHOLS



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- Plasticizers
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- Oil Soluble Esters
- Agricultural Chemicals
- Dry Cleaning Solvents
- Synthetic Lubricants
- Mining Flotation Agents
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In addition to the alcohols listed above, we can produce other isomers and blends tailored for your application.

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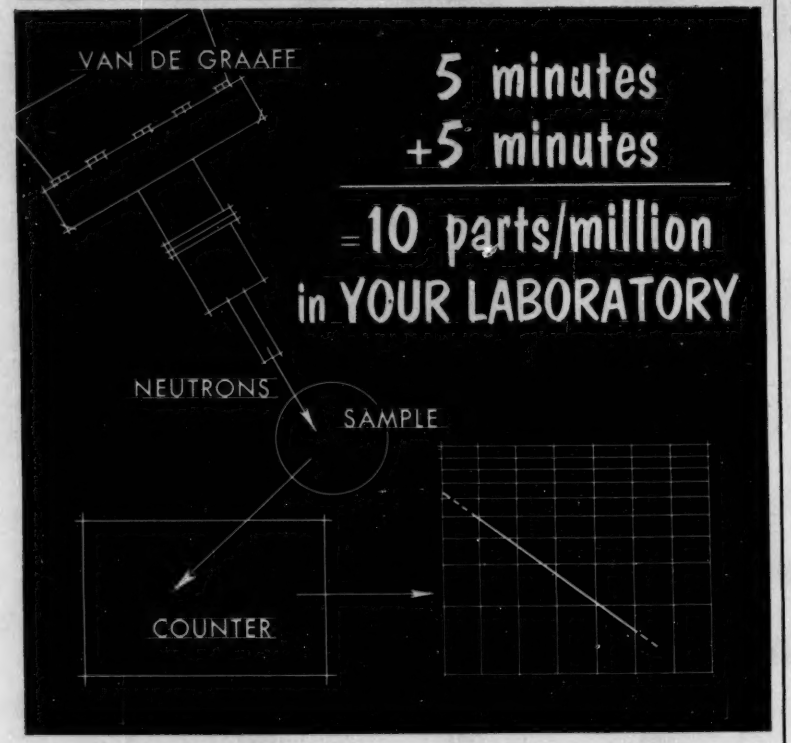
Advances in Applied Radiation

DEVELOPMENTS in APPLIED RADIATION ENERGY, its APPLICATIONS and the APPARATUS USED TO PRODUCE IT



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ADMINISTRATION

KEY CHANGES

J. D. Reynolds, to vice-president; **C. E. Coghill** and **W. Monroe Wells,** to directors; Reynolds Metal Co. (Richmond, Va.).

V. E. Wellman, to manager, Petrochemicals Dept.; **R. W. Daniels,** to manager, Intermediates Dept.; and **P. G. Connell, Jr.,** to manager, Rubber Chemicals Dept.; Organic Chemicals Division, American Cyanamid (New York).

Albert M. Norman, to treasurer, Crown Cork and Seal (Baltimore). more).

Mord Lewis, to vice-president, Anaconda Aluminum Co., subsidiary of Anaconda Co. (New York).

Robert W. Gutheil, to manager, Adhesive Division, Armour & Co. (Chicago).

John T. Ryan, Jr., to board chairman and chief executive officer; **Edgar G. Sanner,** to president; and **W. H. Schechter,** to vice-president, operations; Callery Chemical Co., (Callery, Pa.), subsidiary of Mine Safety Appliances Co. (Pittsburgh).

William L. Garman, to vice-president in charge of the Agriculture Chemicals Division, The Best Fertilizers Co. (Oakland, Calif.).

David H. Lyall, to treasurer, Air Reduction Co. (New York).

KUDOS

To **Charles F. Kettering,** director, General Motors Co., the first Charles F. Kettering Medal, sponsored by the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Institute of Chemical Engineers, and Society of Automotive Engineers.

RETIRED

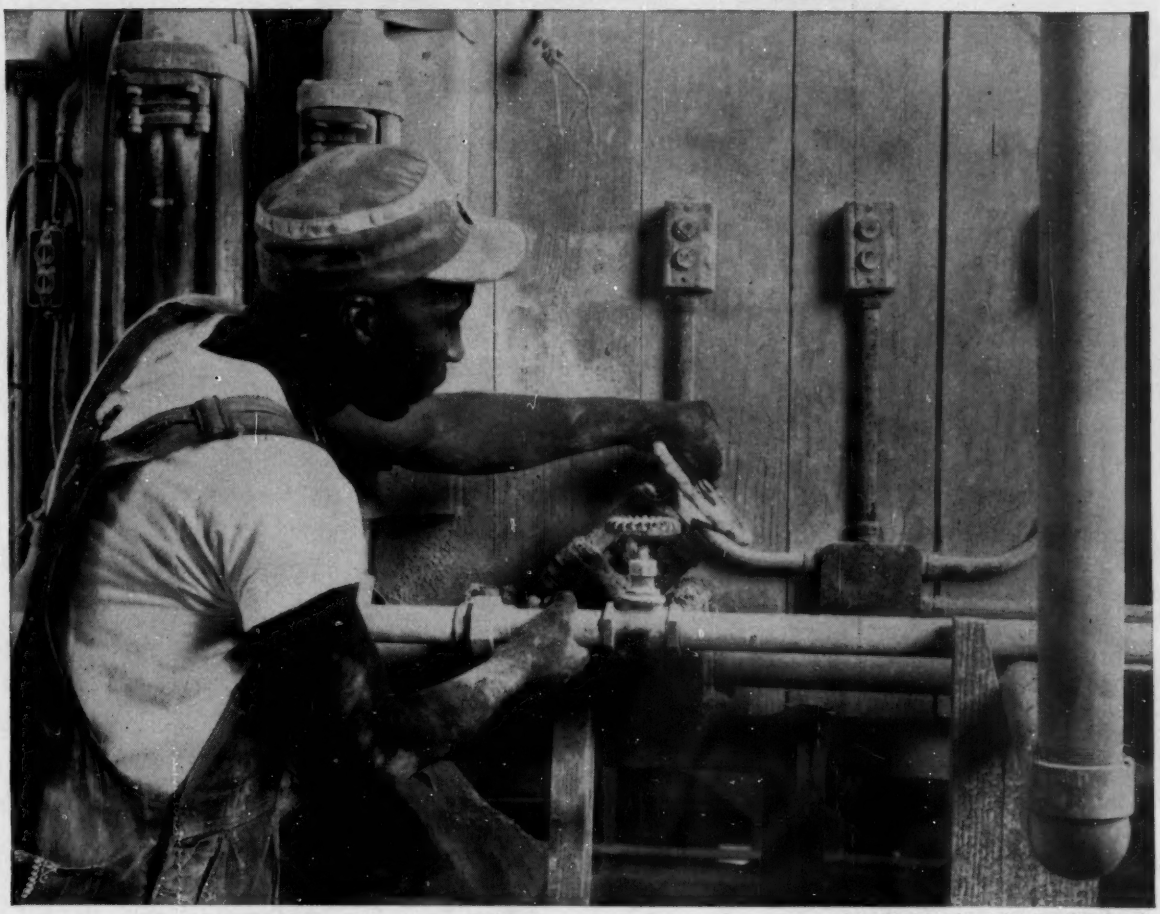
Charles F. Beran, director, Celanese Corp. of America (New York).

DIED

William Henry Bower, 92, past president and director, Henry Bower Chemical Mfg. Co. (Philadelphia), at Easton, Md.

Camille E. Dreyfus, 78, board chairman, Celanese Corp. of America (New York), at New York.

B.F.Goodrich



Cotton Producers Association, Carrollton, Georgia.

Rigid Koroseal pipe used for permanent installation where corrosion ruins metal in six months

SULPHURIC ACID used in making super-phosphate used to be carried in heavy duty black iron pipe from tank to mixing station. The strong corrosive action of the acid made replacement of the pipe necessary every six months, causing expense for new pipe and lost time from production.

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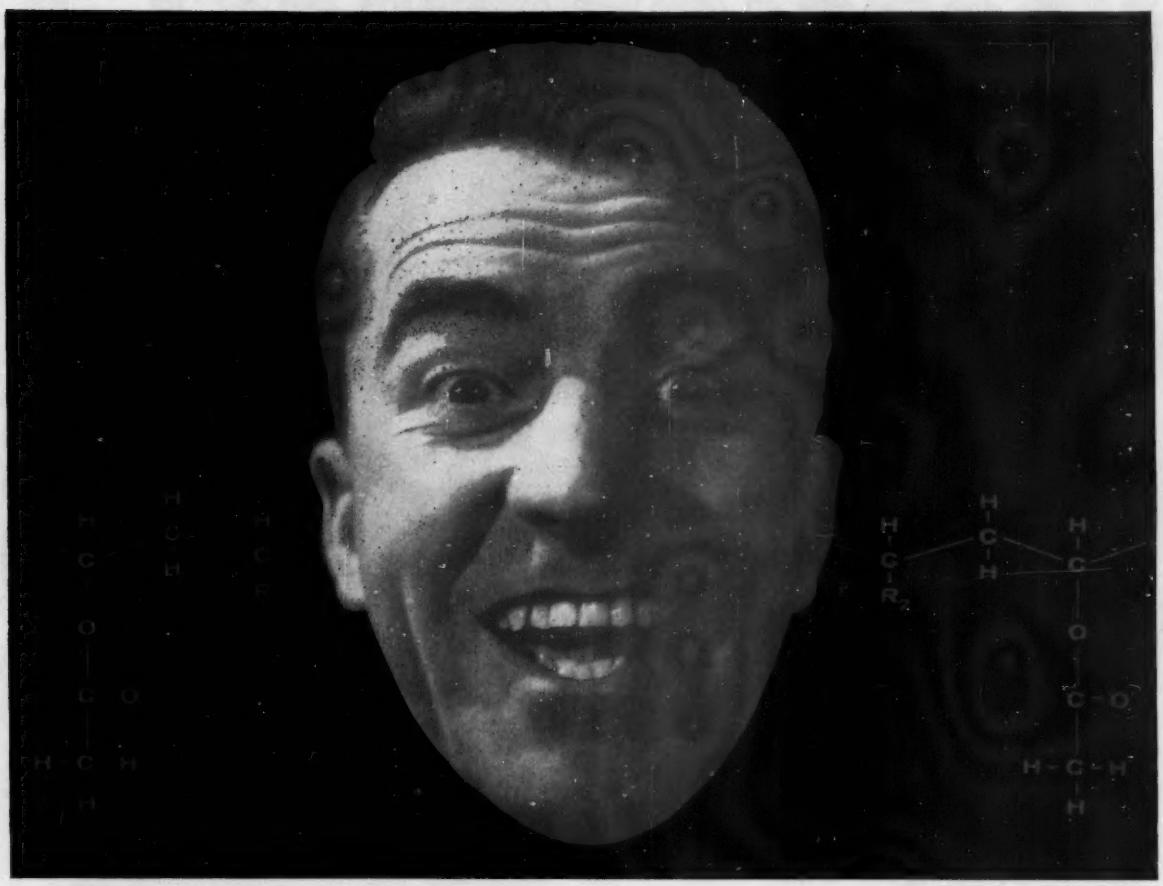

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RESIN DIVISION

National STARCH PRODUCTS INC.

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LBS./GAL.: 8.9 @ 72°F

*Approximate % of dibutyl phthalate which gives similar flexibility with straight PVAc.

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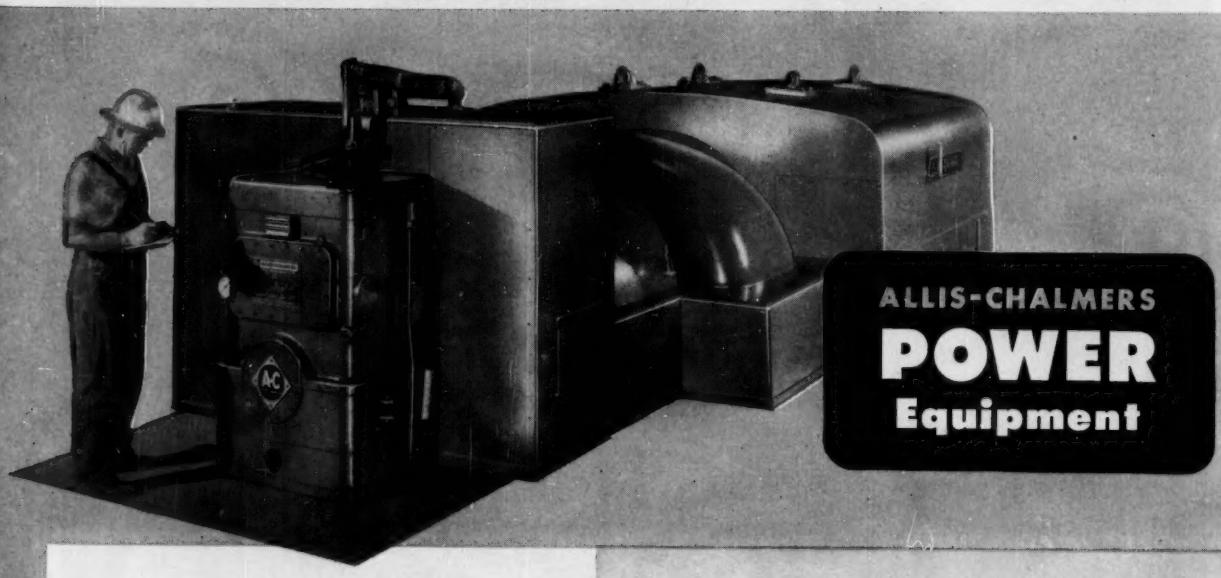

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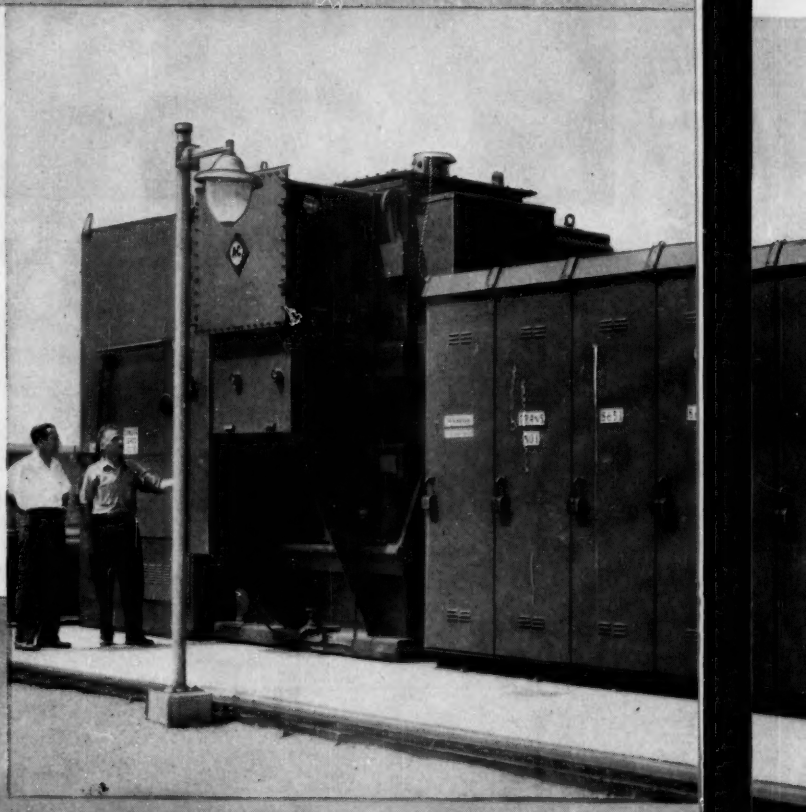
Distribution — *Unit Substations* — In the substation illustrated, Allis-Chalmers switchgear and transformers are combined to provide dependable power distribution. *Dry-Type Transformers* — Available in a wide range of sizes and designs.

Utilization — *Motors* — Standard and special motors for practically every purpose and in any capacity range. Allis-Chalmers offers a complete line of motor *control* and *mercury arc rectifiers* in ratings to fit practically any requirement.



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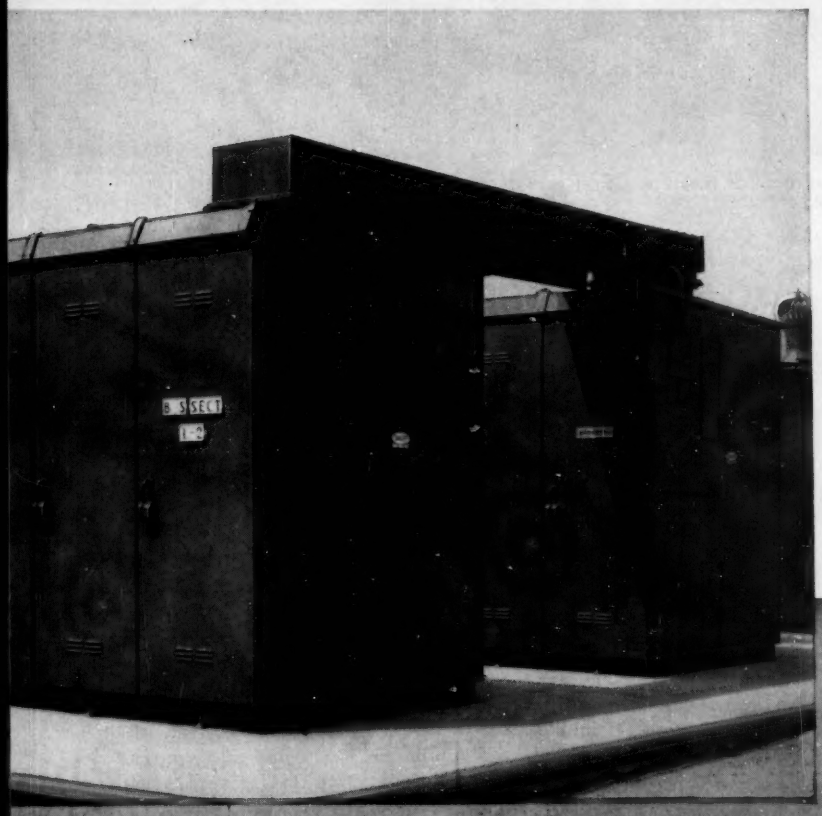
Allis-Chalmers, as a *single source* for a highly integrated power system, offers *single responsibility* for overall system performance.



Allis-Chalmers Builds the Following "Coordineered" Equipment:

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LIQUID HANDLING	5	A complete line of Centrifugal Pumps
AIR & GAS HANDLING	6	Centrifugal Blowers Axial Compressors Rotary and Barrel-Type Compressors and Vacuum Pumps

Allis-Chalmers also makes equipment for solvent extraction, electronic heating, metal detection and inter-floor conveying.

Bulletin 25C6177 covers all Allis-Chalmers equipment for the process industries. Bulletins on specific equipment lines are also available. See your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

CHALMERS

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SPECIALTIES

EWING GALLOWAY

THE 80%: Wrecks, dents, scratches and weather make passenger cars the big piece of the refinishing market.

Repainting Is Big Business, Too

While the nation crowds for a look at the '57 automobiles, market-wise paintmakers are still concentrating much of their attention on the older models. This month, for example, Sherwin-Williams Co. (Cleveland) and its affiliate, Acme Quality Paints, Inc. (Detroit), are busy wooing automobile refinishers with a new enamel called Exlon, similar to the Dythol offered last month by Martin-Senour Co. (Chicago), another S-W affiliate.

Although S-W says it hopes to sell the new finishes to Detroit assembly lines as well, the advertised advantages seem to be pitched right to the local shop: two coats can be applied in 20 minutes, drying time is an hour or less, air (not baking lamp) drying is satisfactory, no special equipment or prefinishing is required, and the finish is not affected by point-of-application climatic conditions.

This new product, coming at a time when industry attention seemed to be focused on the new acrylic lacquers and alkyd-type enamels for application to new cars, points up something that tends to be overlooked: the whole automotive paint story isn't at the assembly line.

Factor of Two: Sales data bear this out. Although market figures for refinishing tend to be a little foggy, an often-used rule of thumb is to figure the market at $2 for every vehicle on the road. Now there are between 60 and 65 million cars in the U.S., so the market—for paints for refinishing alone—stands at $120 million to $130 million.

This rule has a second part. For every dollar spent on paint, industry men say, another is spent for related items: masking tape, sandpaper, rubbing compounds, spray guns, hoses, lead, etc. An over-all estimate of $225 million to $260 million for materials for refinishing automobiles is estimated to be in the right area.

Eighty percent of the paint for refinishing is supplied by eight manufacturers: Sherwin-Williams and its two affiliates; Du Pont; Ditzler Color Division of Pittsburgh Plate Glass Co. (Detroit); Arco Co. (Cleveland); and Rinshed-Mason Co. (Detroit). Du Pont is by far the biggest single factor in the business, but it is believed that the three companies making up the Sherwin-Williams entry collectively equal it.

Success Begets Success: Altogether there are roughly 75,000 refinish shops in the U.S. Most of these are auto dealers, but the greatest volume of painting is done by independent body and paint shops.

The paint manufacturer sells directly to either type of outlet. This business is done through jobbers, rather than through automobile manufac-

THE 20%: Special fleet paint jobs, bought along with special bodies, keep most truck painting out of Detroit.

turer's parts department. And there doesn't seem to be any difficulty involved in getting the formulas for an original color—which implies that Detroit contracts are little help in the refinish business. Paint men disagree.

They point to examples like Acme, which has a contract with Chrysler. Acme writes and prints Chrysler's official paint service bulletins, which go out to refinish shops. It's believed that these give the firm a tremendous competitive advantage. Rinshed-Mason says: "You take your Hoover vacuum cleaner to a Hoover man when it won't pick up the dirt, don't you—in most cases? Same thing applies to paint on the family car."

Fast Paint: Also important—particularly if you lack a Detroit contract—are:

- Being able to show the refinisher how your product can raise his profit margin (as Sherwin-Williams is doing with its Exlon) by speeding up the painting process, which allows him to run more jobs through with his existing plant and labor force, and by not requiring special equipment or risky techniques.
- Giving the refinisher a well-promoted brandname to sell (and policing against unscrupulous refinishers who claim to use your paint but actually use something cheaper). This is important to firms trading on a Detroit contract.

Color Glamor: Such a variety of colors are offered on new automobiles now that no paint company feels it can stock all colors in quantity. Up to three years ago, they could, but modern "glamor" colors now make it a physical impossibility.

To solve this problem—and ease troublesome matching of paints in panel repainting jobs—the industry is moving to "intermixing machines," so that a jobber or painter can mix his colors according to recipes issued by paint manufacturers. Acme has had such a machine for several years and feels it has provided a distinct advantage over competitors. But it also feels that the machine has distinct drawbacks. If the auto plant has let the color "drift" (i.e., change from its original hue by underbaking or overbaking), a panel repaint job with paint mixed to original formula is not going to match, no matter how good the machine. The machines also fall down when used for cars that have been kept out of garages for a long time.

Du Pont is expected to come out with an intermixing machine later this year.

Drab Training: Big weakness in the refinishing business is the lack of painters with accurate eyes. Complains one paint formulator: "The majority of car painters today learned their trade in the Army, spraying olive drab, and they can't tell pink from red." A good painter should be able to adjust the mixing machines to compensate for weathering and drift.

Some of the touchiest refinishing problems come from the use of the currently popular metallic shades that

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M-32

incorporate aluminum flakes. With these, a change in the air pressure in the spray gun will cause the shade to vary from dark to light. Paintmakers see no solution of this problem except getting better-trained painters.

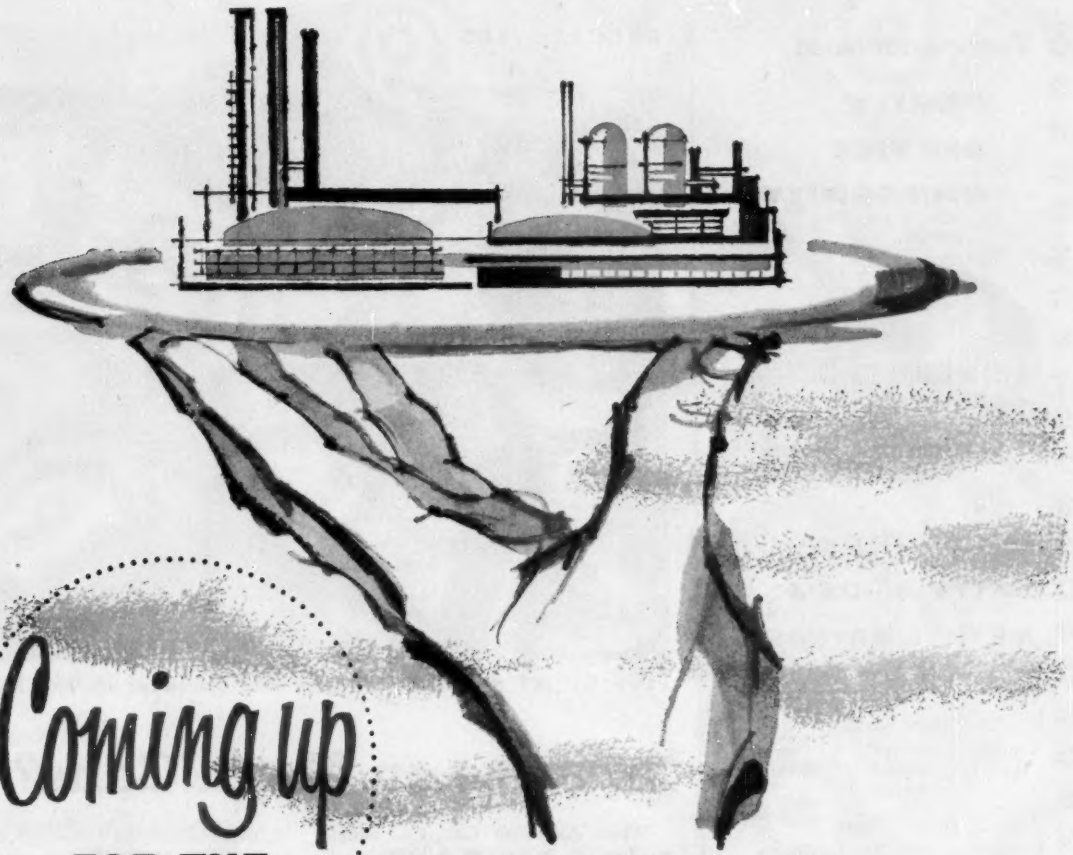
Also calling for more skilled work are the new acrylic lacquer and alkyd enamel (*CW, March 10, p. 73*) now getting a start on the assembly lines—both of which require more careful surface preparation. The acrylic can be used by refinishers in giving a premium job, but the alkyd is a strictly Detroit paint. The high (225 F) baking temperature required would damage tires, glass and upholstery.

Fleet Colors: Trucks make up at least 20% of the outside-the-factory paint market. Most trucks leave the assembly line with just a primer coat, get their final fleet colors at either special body-building shops or in the owners' own maintenance shops. In a recent survey, *Fleet Owner* magazine found that of 693 fleets comprising 14,776 vehicles, 451 applied their own paint. Also found:

- The average truck was repainted once every 30 months.
- A truck received an average of three partial paint jobs for each complete repainting.
- Only one-sixth of the fleet operators who ordered outside paint work failed to specify the brand of paint to be used.

Lacquer is seldom used in painting trucks, and the paint jobs are seldom baked. As might be expected, trucks owned by bakeries, dairies and city delivery services are painted more often than those operated by construction firms; owners in big cities paint their trucks more often than those in small towns. A regional difference also shown up: trucks are kept up to a higher standard of appearance in the East and on the West Coast than in other parts of the country.

Weather and Wrecks: Everyone in the industry agrees that the repaint market is going to get bigger and bigger. Auto manufacturers feel that within the next 10 years there will be upwards of 70 million cars on the highways. Says one maker: "As long as there is weather in the U.S., and as long as there are overcrowded roads and accidents—there will be a big market for the services of the automobile refinisher and for refinishing paints and paint equipment.



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PUFF, SQUIRT, SPRAY: Three nozzles bring Bracon can into three big fields.

Squeeze on Metal Cans?

When American Can Co. bought Bradley Container Corp. (Maynard, Mass.) from Olin Mathieson last week (see p. 118), it acquired, among other things, a plastic specialties container that's fast-growing competition for metal cans in many of the latter's specialty—including aerosols.

The package, Bradley's 2ME (two metal ends) container, is an especially serious threat, because it appears to be on the threshold of matching the price of metal cans—an unaccustomed position for plastic containers to find themselves in.

Gravity of the challenge is highlighted by 2ME's success among the cost-conscious detergents industry. Five light-duty dishwashing liquids are now using the polyethylene cans: Colgate's Vel, B. T. Babbitt's Glim, Linco, Purex's Trend, and a forthcoming product from Texise Chemicals, Inc. In addition, Procter & Gamble and Lever Brothers are giving the squeeze cans more than routine tests.

The detergent customers are no surprise to Bradley; the 2ME was designed as a price-trimmed bid to Vel. Colgate liked polyethylene's squeeze-and-squirt application, would have liked to put Vel into tubes. But the price was too much higher than that of metal containers (although Bradley was offering giant tubes at prices well under that of all-plastic bottles).

2ME, however, comes closer to matching metal packages in cost than does any other polyethylene container. About 5¢/can cheaper than all-plastic, the squeeze package is only a penny or two higher than all-metal. Both Bradley and detergent makers anticipate that the gap will be further narrowed, and that possibly the advantage will shift over to polyethylene as metal prices rise and polyethylene prices go down.

Another factor—which occasionally allows the container to compete on a cost basis with glass—is polyethylene's lighter weight. For many users, the freight savings go a long way toward offsetting higher initial cost.

The container that accomplishes all this looks, at first glance, much like a metal can.* It is a seamless extruded cylinder of polyethylene with metal ends crimped on by a cold mechanical process. The elimination of blow molding, excess trim and heat-sealing account for the reduced cost.

Squeeze Play: Needless to say, 2ME squeeze cans wouldn't have gone as far as they have if they hadn't offered

*By using roller offset printing, the containers can be made almost indistinguishable from a printed metal can, with fine detail, good color and small type.

Koppers announces

NEW PAINT LATEX

DYLEX* K-34

fortified for improved pigment binding

. . . improved freeze-thaw stability!

NEW DYLEX K-34 PAINT LATEX is a styrene-butadiene latex *fortified* with an additional ingredient added during polymerization. The result is a superior latex of extremely fine particle size.

Fortified DYLEX K-34 has better pigment binding strength than conventional styrene-butadiene latices. That means better freeze-thaw stability, stronger adhesion to a variety of surfaces, improved stain removal, and excellent scrub resistance. Storage stability and color development also have been improved in DYLEX K-34.

DYLEX K-34 Paint Latex has good mechanical stability. Paints of high solids content can be formulated with it easily by conventional methods, on existing equipment. It can be combined with present styrene-butadiene latices, long oil alkyds, and proteinaceous or cellulosic water-soluble resins if desired.

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THIS NEW DYLEX K-34 Paint Latex has been tested and approved in a variety of paint formulations.

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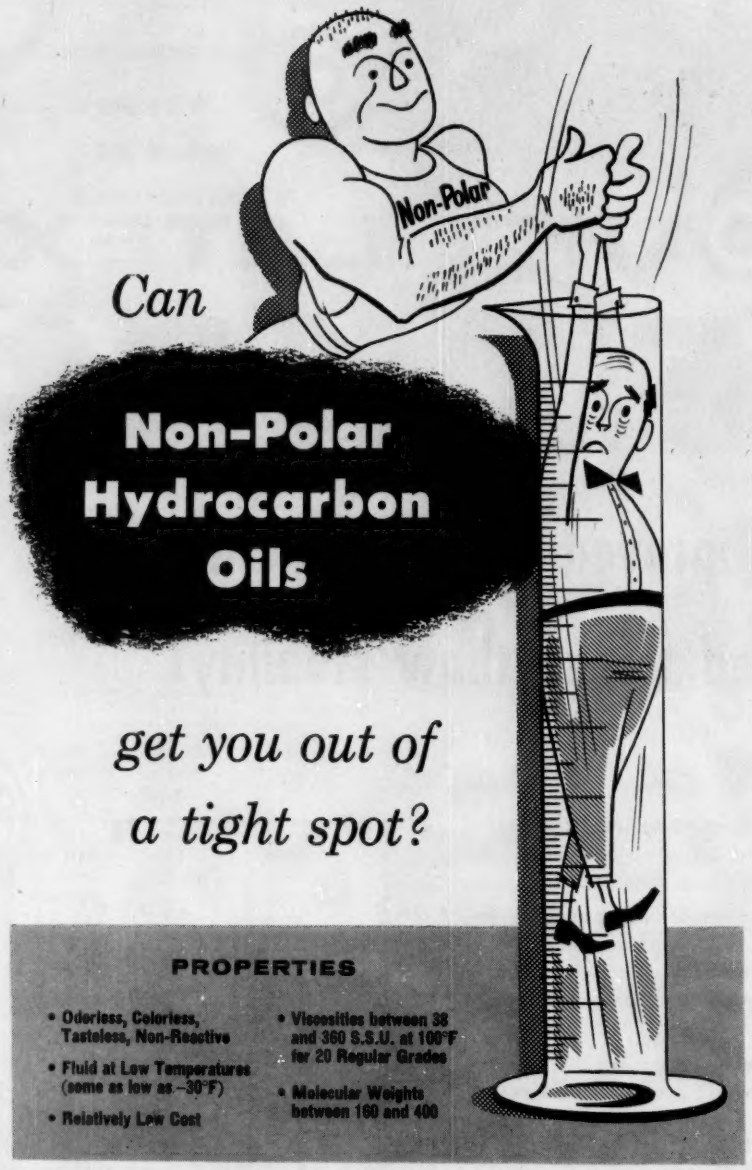
Sales Offices: **PITTSBURGH • NEW YORK • BOSTON • PHILADELPHIA • ATLANTA • HOUSTON • CHICAGO • DETROIT LOS ANGELES • SAN FRANCISCO** **In Canada: Dominion Anilines and Chemicals Ltd., Toronto, Ontario**


Non-Polar
Can
Non-Polar
Hydrocarbon
Oils
get you out of
a tight spot?
PROPERTIES
• Odorless, Colorless, Tasteless, Non-Reactive
• Fluid at Low Temperatures (some as low as −30°F)
• Relatively Low Cost
• Viscosities between 38 and 360 S.S.U. at 100°F for 20 Regular Grades
• Molecular Weights between 160 and 400

Can any of the above properties help you solve a problem in the quality or processing of your products? Non-polar hydrocarbon oils (white oils) have long been used by makers of drug and cosmetic preparations. Today the application of these versatile oils goes far beyond, into fields where their purity, stability and low cost are employed to considerable advantage in a wide variety of products.

CURRENT APPLICATIONS: reaction media; extractants; aliphatic raw material; plasticizers; softeners; anti-caking, anti-dusting and detackifying agents; water repellents; special lubricants; textile specialties.

Write for detailed specifications or consult the Penn-Drake Technical Service.

penn drake products

PENNSYLVANIA REFINING COMPANY
BUTLER 20, PENNSYLVANIA
Branches: Cleveland, Ohio and Edgewater, N. J.
Representatives in all Principal Cities

other advantages to compensate for their still slightly higher price. Chief among these is the squeeze application —which not only offers convenience and novelty to the consumer, but also helps the products it contains to win hard-to-get supermarket shelf space. By eliminating the spout (such as those the metal cans have), the 2ME container is stackable.

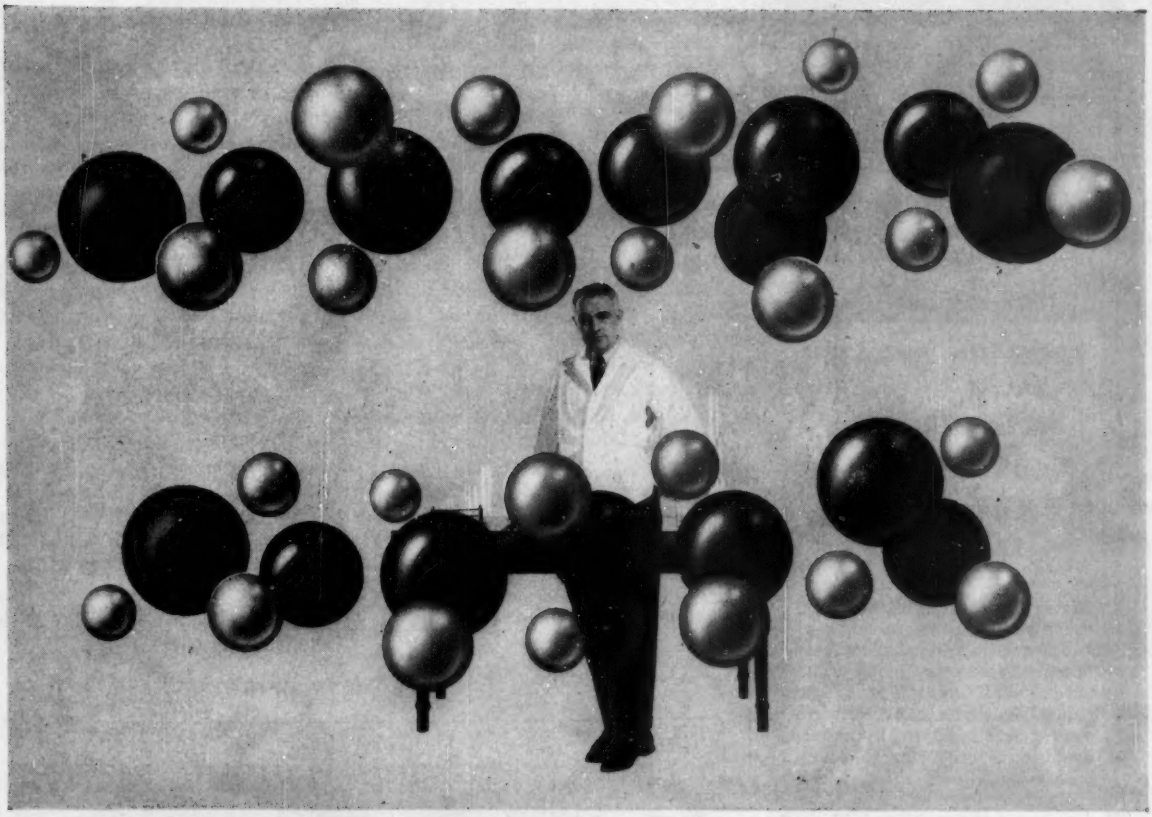
Not all of the squeeze can's growth has been at the expense of metal, however. Makers of insecticide and fungicide dusts, a big item in the 2ME picture, had searched for some time for a suitable package-applicator, settled reluctantly for a cardboard pump gun. A special atomizer nozzle was developed to fit the polyethylene can, and now seven dust makers are using the can, and six others are about to.†

Like aerosols—with which the squeeze cans compete, to some extent —the Bracon package has also inspired a few new products, so far all in the automotive cleaning field. These include whitewall tire liquid spray cleaners by Knight Oil Co., Banner Mfg. Co., Alsol Products; and a body cleaner called Mirrorize, by Kammel. These four products feature a third type of 2ME nozzle, which delivers a spray, or liquid, mist.

Fill In: The dust cans are filled from the bottom and capped with polyethylene plugs, removable for refilling (deliberately made not too easy to do). The others are filled through the small hole on top, which is plugged with the one-piece nozzle and cap. Existing can-filling equipment can be used with little modification except that the collapsible containers cannot be vacuum-filled. However, B. T. Babbitt was able to convert its vacuum-filling equipment for less than $5,000 so it could pressure-pack Glim into 2MEs.

For the future, Bradley sees improvements that should make the 2ME available for many more products, cheaper for all. New linings should help lick the permeability problem that now keeps many formulas out of polyethylene (*CW, Nov. 12, '55*). Also expected to make the cans more versatile and less costly are the coming high-pressure polyethylenes — which will make possible thinner (and cheaper) walls while retaining the same rigidity.

†Now using: Du Pont, Breck's, Miller Chemical, Boyle-Midway, Reasor-Hill, Halphen-Connelly (for a fire extinguisher), Delta Labs. Will use: Sears Roebuck, Asgrow, American Chemical Paint, Sherwin-Williams (Acme), Diamond Black Leaf, California Spray Chemicals.



These CARBIDE POLYOLS ✳

can aid your search for better resins

✳ **1, 2, 6-HEXANETRIOL** $CH_2OH \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CHOH \cdot CH_2OH$

Urethane foams, produced by the reaction of polyesters made from 1,2,6-hexanetriol with diisocyanates, possess good resilience and flexibility.

Added benefits—Liquid 1,2,6-hexanetriol speeds mixing in polyester manufacture and eliminates sublimation often encountered with solid polyols during esterification.

✳ **1, 5-PENTANEDIOL** $CH_2OH \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2OH$

The terminal hydroxyl groups and long carbon chain make this CARBIDE polyol a promising intermediate for polyester resins. Absence of ether linkages improves resistance to degradation caused by heat and oxidation resulting from high temperature conditions.

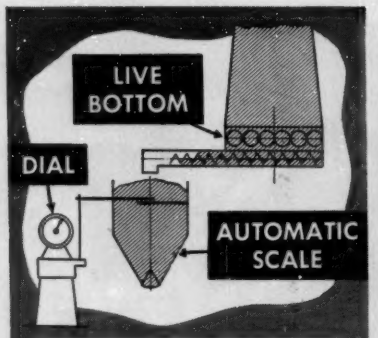
These improved properties of polyesters based on 1,5-pentanediol should be of particular interest in the manufacture of magnet wire enamels and reinforced polyesters for structural applications requiring the greatest possible resistance to thermal degradation.

If you haven't evaluated these polyols, then write today for samples and technical data. Address—Carbide and Carbon Chemicals Company, Room 308, Dept. H, 30 East 42nd Street, New York 17, New York.

In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

CARBIDE AND CARBON CHEMICALS

Carbide and Carbon Chemicals Company
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.



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Automatic Weight Control

Materials that need measurement need perfect control . . . from storage bin to completed batch . . . for accurate and profitable results. Automatic weight control—engineered by Richardson—is here indicated by a storage bin tapered out to eliminate material arching . . . a live bin-bottom opening on a take-away screw for positive feed . . . and a fully automatic scale weighing, where necessary, to accuracies as close as 1/10 of 1%! Every step of the way, the human element in personal supervision is eliminated, and positive, dependable remote control is achieved!

Qualified by the experience and knowledge of a company more than 50 years in the field, Richardson engineers not only build the finest in automatic scales . . . they design bin-to-batch automated materials handling systems complete with coordinating electrical control panel installations. Richardson's policy of single responsibility and complete dependability is based on **EXPERIENCE** and is your assurance of top quality product and performance.

Do as other leading manufacturers have done: rely on Richardson for profitable automatic weight control! It's worth investigating. 3075

Richardson

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Chemicals in the Pines

Like weeds in a cornfield, young, overdense, stagnating lodgepole pine-stands in young forests sap the soil of nourishment, keep more-valuable trees from developing properly. The Forest Research Division of Canada's Dept. of Northern Affairs and National Resources, among others (*CW, Oct. 6, p. 52*), is looking for an answer among chemicals.

The researchers, under D. I. Crossley, are experimenting with several herbicides. Ammonium sulfamate was found to reduce densities as much as 68% over a five-year period, which isn't considered to be a sufficient duration of effectiveness.

Most promising are the herbicides 2,4-D and 2,4,5-T, which afford lodgepole pine mortalities of 90% or better. At the same time, mortality among the more-desirable white spruce was light.

The most efficient spray formulation proved to be a per-acre dosage of 2 gal. of 2,4-D in an oil-water emulsion consisting of 25 gal. of diesel fuel and 75 gal. of water.

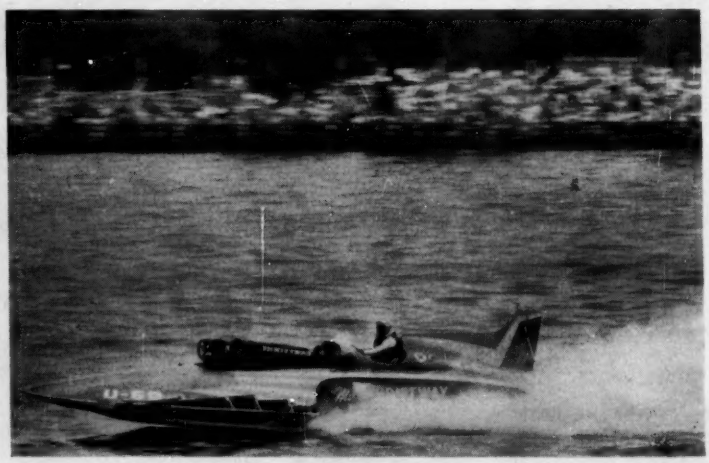
Antifly Machine

A new piece of equipment developed by Technion (Israel Institute of Technology) is designed to make insecticides more effective in the battle against the Mediterranean fruit fly.

The device consists of:

- An "evaporator" operated on ethylene bromide, which fumigates 50,000 boxes of fruit an hour.
- An "analyzer," which reads the effectiveness of fumigation within half a minute instead of in several hours as is needed by conventional methods.

Previously available instruments to



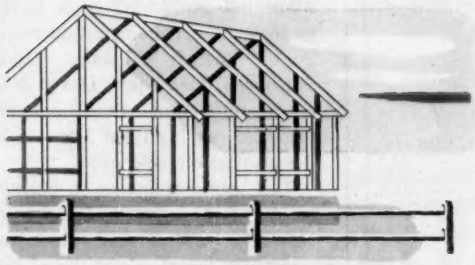
Silicones Slip into Race

MISS THRIFTWAY skimmed into first place in this year's President's Cup race on the Potomac and may have slipped silicones into a new market. Shortly before the race, the speedboat's sleek Durel sponsons were sprayed with a General Electric silicone masonry water repellent. Since then, racing fans, the U.S. Navy, and General Electric have been wondering whether the slippery coating was what gave the boat the margin of victory. Many believe that by helping it to reach operating speed sooner and get quicker acceleration after turns, the silicones were the deciding factor. Although GE reports that the Navy and a number of boat owners have expressed interest, it isn't yet ready to offer a speed spray for boats. Needed first: more exact knowledge of how long each spray will last and other benefits.

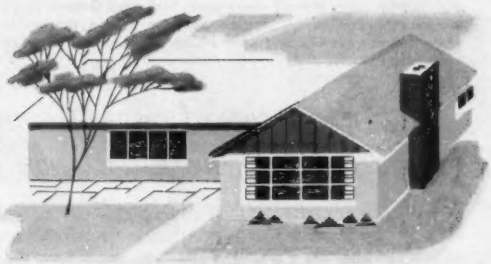
PROBLEM: PRESERVATION

ANSWER: NUODEX ADDITIVES

SPECIALIZED CHEMICALS TO HELP MAKE GOOD PRODUCTS BETTER



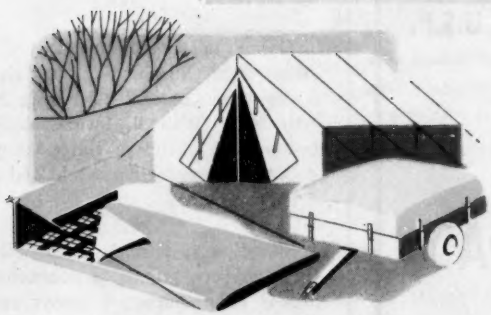
for wood preservation



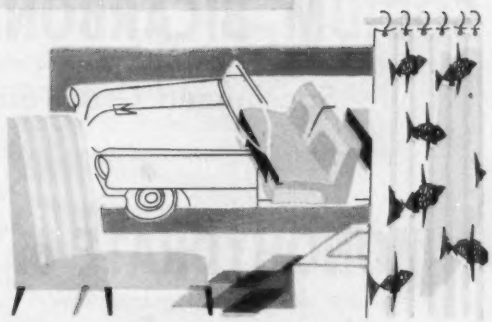
for paints

EXAMPLE: Nuodex Fungicides

MANY TYPES FOR MANY INDUSTRIES



for textile preservation



in the world of plastics

Nuodex Fungicides provide protection against microbial deterioration—characterized by mildew, decay, dry rot—in fine adhesives, cordage, paints, plastics, textiles, wood, leather . . . to name only a few.

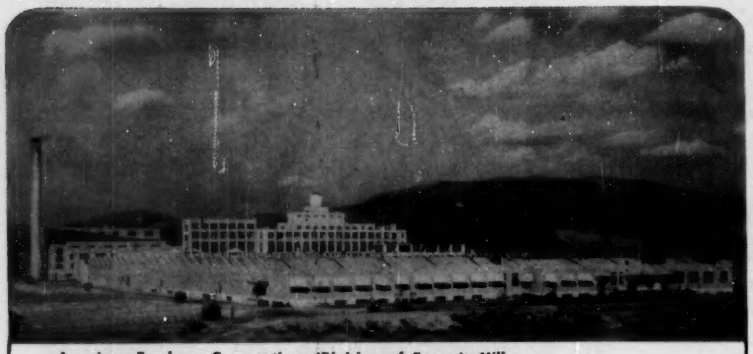
Meeting the exacting requirements of many industries, Nuodex offers a broad range of preservatives—mercurials, metallo-organics, and organics. Years of laboratory and field experience back every product.

If you have a problem in preservation, we invite the opportunity to help you solve it. Cooperative technical service, literature, and samples are available to you at all times.

Nuodex Additives are chemical compounds designed to serve many industries in many ways. Behind them is a policy of continuous research. Available to you is cooperative research, without obligation, on any problem within our wide scope. For an old or a new formula, if you feel that your product is "just one step short of perfection" we will be happy to discuss it with you. We may already have the answer.

NUODEX PRODUCTS COMPANY... 342 MADISON AVENUE, NEW YORK 17, N. Y.

A Division of Heyden Chemical Corporation



American Bemberg Corporation, *(Division of Beaunit Mills, Inc.)*, Elizabethton, Tenn. This plant is the outstanding producer of cuprammonium process rayon yarn. Lockwood Greene made a comprehensive survey for an optimum site in the southeastern states for the first unit, whose capacity was doubled two years later.

An experienced corps of consultants and designers to work with you for a low cost competitive plant or enlargement.

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SPECIALTIES

test strength of ethylene bromide present in a room and the effectiveness of fumigation, says Technion, give far from accurate results. Reason: readings take several hours, during which the chemicals are absorbed by wood and other materials present. The new analyzer is an interferometer.

Costlier Coatings

At the retail level, most household paints will cost 25-30¢ more a gallon when just-announced price increases go through. Six major producers—Du Pont, Sherwin-Williams, Glidden, Pittsburgh Plate Glass, Devoe & Raynolds, and National Lead—announced increases ranging from 3 to 4½% at the wholesale level.

This round compares in magnitude to the last industry-wide boost in November of last year, which raised prices upward of 3% at the wholesale level, 5-10% at retail.

The increases weren't across the board. Industrial and automotive finishes aren't included; some lines of household paints retain their old price. The inching upward of raw material, freight, and container costs are generally cited by the makers as behind the move.

•

Going Abroad: Permachem Corp. (West Palm Beach, Fla.) has signed a long-term contract permitting Heberlin AG. (Wattwil, Switzerland) to become the exclusive European producer of Permachem's mould and mildew preventer.

•

Into Epoxy: Reichhold Chemicals, Inc., has been granted a nonexclusive license to manufacture epoxy resins under Devoe & Raynolds (division of Merritt-Chapman & Scott Corp.) patents. The license is effective in the U.S. and Canada.

•

Joint Mop Up: Procter & Gamble and American Marietta's O-Cedar Division have teamed up on a nationwide promotion linking P&G's Spic and Span and O-Cedar's sponge mops. Spic and Span store displays and packages will feature word of a special offer on O-Cedar mops.

PRODUCTS

Inks in the Valley: Designed especially for printing on polyethylene

Check the solvents you use

and see the advantages of

isobutyl acetate

☑ ***if you use n-Butyl Acetate,*** isobutyl acetate can be used interchangeably in most cases. In lacquer formulations, for example, isobutyl acetate can usually be substituted without any apparent change in handling characteristics of the lacquer or physical properties of the resulting film. And you do this with an 11% savings, at today's prices.

☑ ***if you use MIBK,*** by substituting isobutyl acetate, you achieve better blush resistance and improved flow-out, again with an 11% savings in cost. In addition, manufacturers using methyl isobutyl carbinol with MIBK to increase blush resistance and flow-out will find this unnecessary when they switch to isobutyl acetate—effecting a further savings.

☑ ***if you use n-Butyl Acetate with sec-Butyl Acetate or n-Propyl Acetate,*** your cost per gallon with any usable combination is probably greater than with isobutyl acetate alone. Moreover, isobutyl acetate gives better blush resistance and flow-out, and frees a storage tank for other purposes.

Eastman isobutyl acetate offers other advantages, in addition to lower cost and improved final product. The mild, pleasant odor of this solvent is preferred by most people over the stronger odor of n-butyl acetate. Its price is stable. And because it weighs less per gallon than n-butyl acetate, you save over $1,000 on every 8,000 gallon tank car you buy at current prices.

As a result, isobutyl acetate is finding wide acceptance as a lacquer solvent in its own right, as well as a satisfactory replacement for more expensive solvents. For additional information on this Eastman solvent, contact our nearest sales office or write to EASTMAN CHEMICAL PRODUCTS, INC., Chemicals Division, KINGSPORT, TENNESSEE.

Eastman
CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE
subsidiary of EASTMAN KODAK COMPANY

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

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DI-t-BUTYL PEROXIDE

STABLE, LIQUID POLYMERIZATION CATALYST FOR USE AT TEMPERATURES ABOVE 100°C

ASSAY—97% (MIN.)

WAREHOUSE STOCKS CONVENIENTLY LOCATED THROUGHOUT THE COUNTRY

LUCIDOL DIVISION
WALLACE & TIERNAN INCORPORATED
BUFFALO 5, NEW YORK

SPECIALTIES

film, a new series of "valley," or "inlay," (three-dimensional) printing inks has been introduced by Claremont Pigment Dispersion Corp. (Roslyn Heights, N.Y.). The new MB series is said to offer an extremely high flash-point; sharp, opaque prints, and stability in storage. The products will not dry on embossing rolls during operation, it is claimed.

•

Under the Light: New Skrip, a fountain-pen ink being brought out by W. A. Sheaffer Pen Co. (Fort Madison, Iowa), contains an additive, called RC 35, that fluoresces under ultraviolet light. Object: if checks or records should be altered, the original wording would be legible under ultraviolet light.

•

All New: New Super-Rinse All is being introduced throughout 24 Eastern states by Monsanto. Advertising for the product features the claim that it rinses away "suds scum." The new detergent is also claimed to brighten clothes without a bleach.

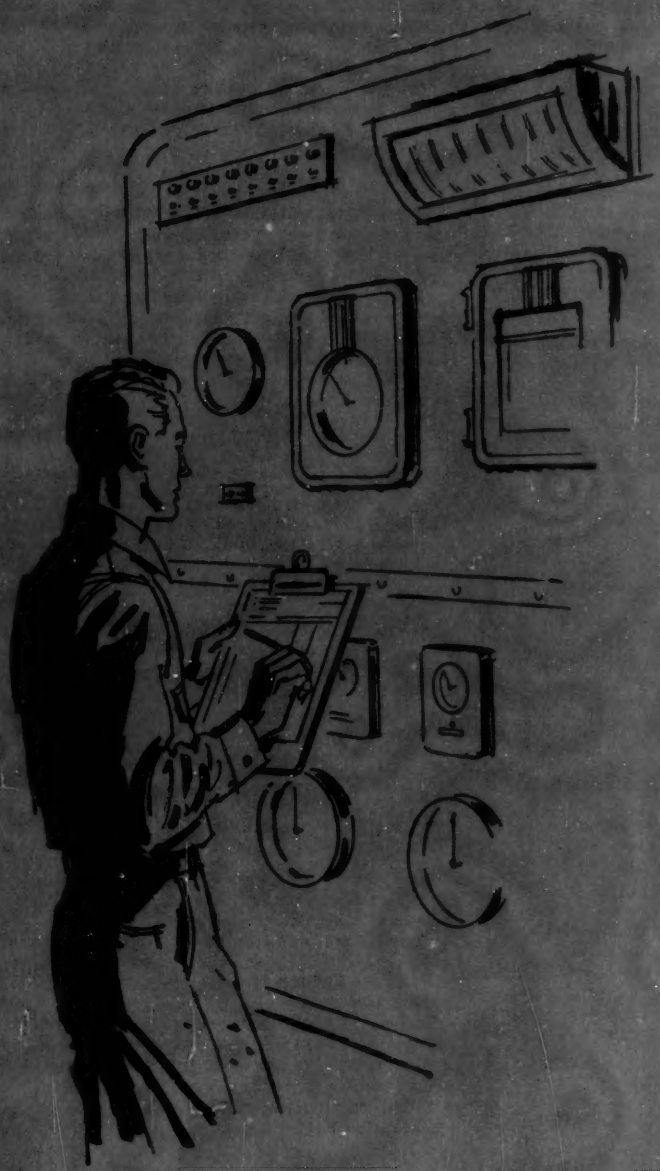
•

Bring 'em Back: The National Appliance and Radio-Television Dealers Assn. is prepared to supply its members with two types of detergent under the name Wash Well. One is a sudsing type, the other a controlled sudser. Both products are made by a leading supplier of private-label detergents. Appliance dealers' zest for detergent selling is largely the result of their experience in distributing Monsanto's All during the product's early days; All has since gone to supermarkets. The prestige of the store's assumed knowledge of laundry equipment helps sell soap without price competition. And customers making regular returns for new detergent make good appliance sale prospects.

•

Double-Edged: A new double-faced pressure-sensitive adhesive film is potential competition for some jobs done by liquid adhesives and mechanical fasteners. Double-Face, as the film is called, is claimed to derive great strength from its special tissue reinforcement. It's pliable, conforms to irregular surfaces. Three types—soft, medium, and firm—are available from Angier Adhesives, division of Interchemical Corp. (Cambridge, Mass.). Rolls are ⅛-39 in. wide, 79 yds. long.

principal chemicals of the Du Pont Polychemicals Dept. 1957 FILE



A dependable source for solvents, organic acids, alcohols and other basic chemicals...

the POLYCHEMICALS DEPARTMENT of DU PONT

You can rely on the quality and ... from the **DU PONT POLY...**

ADIPIC ACID

$(CH_2)_4(COOH)_2$ — **White crystals**

Adipic acid is an organic dibasic acid with the chemical properties characteristic of this group of compounds. It is soluble in alcohol, slightly soluble in water.

Adipic acid is used in the manufacture of adipic acid esters. These esters are excellent plasticizers, especially for vinyl resins, to which they impart good low-temperature properties. Other uses of adipic acid include the manufacture of modified alkyd resins and polyesters for polyurethane foam and rubber production.

Shipped in 50-lb. multi-ply paper bags from strategically located stock points.

"ARBONEELD"* A

dimethylolurea — **Coarse-ground solid**

"Arboneeld" A is a urea-formaldehyde composition with a urea-formaldehyde mol ratio of 1:2, and a minimum urea-formaldehyde content of 87% by weight. It is water-soluble up to 24.2% by weight at 20°C.

"Arboneeld" A is used in the impregnation of wood to increase hardness, density and dimensional stability; as an insolubilizer for starch in clay-coated papers; and in certain specialty applications common to urea-formaldehyde resins.

Shipped in 100-lb. paper bags.

CRYSTAL and SHOTTED UREA

(carbamide) $(NH_2)_2CO$ — **White crystals or pellets**

Industrial urea is one of the most versatile of all basic chemicals. Because of its reactivity with aldehydes, it finds one of its major uses in urea-formaldehyde thermosetting resins for adhesives, protective finishes, molding powders and for treating paper and textiles.

Because it neutralizes acids, urea is used in ammoniated dentifrices and as a stabilizer. It decomposes at temperatures over 133°C. to release carbon dioxide and ammonia gases, permitting its use in the manufacture of many foamed products.

Urea is used extensively for softening paper and cellulose; its hygroscopic properties are particularly helpful in this application. And because urea has the ability to increase the solubility of certain compounds in water, it is used in paper adhesives and in starch coatings.

Other applications of industrial urea include its use in the synthesis of dyes and pharmaceuticals, in fire-resistant paints, and with starch and other materials for weighing, sizing and finishing textiles.

Both crystal and "shotted" ureas are shipped in 100-lb. multi-ply paper bags from strategically located stock points.

DIGLYCOLIC ACID

$O(CH_2COOH)_2$ — **White crystals**

Diglycolic acid is a dibasic acid, completely soluble in water and the lower alcohols. Its major use is in the manufacture of resins and plasticizers.

Chemically, diglycolic acid reacts with alkalies to form acid and neutral salts and with alcohols to form esters. It reacts with ammonia—under proper dehydrating conditions—to form either the amide or the six-membered cyclic imide.

Shipped in 50-lb. multi-ply paper bags.

DIMETHYL SULFATE

$(CH_3)_2SO_4$ — **Clear, colorless liquid**

Dimethyl sulfate is a highly reactive compound and is an important methylating agent in organic synthesis. It is reactive at low temperatures; its high boiling point (188.8°C.) permits its use at atmospheric pressure; it is economical. Dimethyl sulfate is soluble in alcohol, ether and benzene. It is used in the manufacture of a number of synthetic drugs and in certain dye intermediates.

Shipped in tank cars and special 10-gallon and 55-gallon returnable steel drums.

FORMAMIDE

(technical) $HCONH_2$ — **Clear, colorless liquid**

Formamide is an exceptionally good solvent for inorganic salts, casein, gelatin, animal glue, starch, lignin, glucose, and zein. It is completely miscible with water, methanol, and ethanol.

Applications for formamide, other than as a solvent, include its use as a softener (e.g., in paper, glues); as an intermediate in the manufacture of pharmaceuticals; and in the manufacture of formic acid.

Shipped in tank cars and 55-gallon non-returnable steel drums.

"HEXALIN"*

cyclohexanol $C_6H_{11}OH$ — **Clear, colorless liquid**

"Hexalin" cyclohexanol is a particularly good solvent for gums, resins and waxes. It is miscible with alcohol, aromatic hydrocarbons and most other common organic solvents. It is soluble in water up to 3.6% by weight (at 20°C.) and dissolves in water up to 11% by weight.

"Hexalin" is especially useful in the manufacture of ester plasticizers. It is also used as a solvent in lacquers, shellacs and varnishes; as a non-corrosive degreasing agent for metals; as a diluent thinner of fuel-oil additives; and as a stabilizer in textile soaps.

Shipped in tank cars and 55-gallon non-returnable steel drums.

HYDROXYACETIC ACID

(glycolic acid, tech. grade, 70%) $HOCH_2COOH$ — **Straw-colored liquid**

Hydroxyacetic acid is a relatively strong organic acid, having properties common to this class of compounds. It is miscible in all proportions with water and water-soluble organic solvents such as methanol, ethanol, acetic acid and acetone. It is easier to handle than the mineral acids and more economical than other organic acids.

Hydroxyacetic acid is used in acid detergents for the cleaning of dairy and similar equipment. Other applications include its use in electropolishing and electroplating solutions, in the acid dyeing of wool as well as in the dyeing and tanning of leather.

Shipped in tank cars and 50-gallon wooden barrels.

"HYTROL"* O

cyclohexanone $C_6H_{10}O$ — **Clear, colorless liquid**

"Hytrol" O cyclohexanone is an especially outstanding solvent for nitrocellulose and for polyvinyl chloride and its copolymers. It dissolves a number of plastics and resins and is miscible with ether, alcohol and most other organic solvents. Nine grams of "Hytrol" O will dissolve in 100 cc. of water at 30°C.

"Hytrol" O is used in many types of finishes, especially those based on vinyl resins. It is also used as the active ingredient in vinyl dispersions, as a solvent for DDT in insecticides.

Shipped in tank cars and 55-gallon steel drums.

niformity of each of these chemicals

CHEMICALS DEPARTMENT

"LOROL"*

fatty alcohols $CH_3(CH_2)_nCH_2OH$

"Lorol" fatty alcohols are a group of straight-chain (normal) even-numbered carbon alcohols ranging from C-8 (n-octyl) to C-18 (stearyl).

"Lorol" fatty alcohols can be esterified with acids to form the corresponding esters. They can be oxidized to the corresponding aldehyde, which can be oxidized further to the corresponding acid.

"Lorol" fatty alcohols are readily sulfated to form excellent detergents. They are also used as emulsifying and softening agents in cosmetics, salves and ointments; in the manufacture of plasticizers; in the manufacture of lubricating-oil additives; and as anti-foam agents in the paper and textile industries. "Lorol" fatty alcohols are available in the compositions shown below:

"Lorol" 5, "Lorol" 7 and "Lorol" 9

Viscous colorless liquids

. . . technical lauryl alcohols . . . are available in mixtures made up principally of lauryl and myristyl alcohols in varying proportions. "Lorol" 5, "Lorol" 7 and "Lorol" 9 are insoluble in water, and are completely miscible above 30°C. with methanol, 95% ethanol, ethyl ether and benzene.

Shipped in tank cars and 55-gallon drums.

"Lorol" 20

Viscous colorless liquid

. . . essentially n-octyl alcohol, $CH_3(CH_2)_6CH_2OH$. "Lorol" 20 is only very slightly soluble in water (0.059g. octanol per 100 g. water at 25°C.); completely miscible at room temperature with methanol, ethanol and ethyl ether.

Shipped in tank cars and 55-gallon drums.

"Lorol" 22

Viscous colorless liquid

. . . essentially n-decyl alcohol, $CH_3(CH_2)_8CH_2OH$ . . . is insoluble in water; completely miscible at room temperature with methanol, 95% ethanol, ethyl ether, benzene, cyclohexane, carbon tetrachloride, ethyl acetate, and acetone.

Shipped in tank cars and 55-gallon drums.

"Lorol" 24

$CH_3(CH_2)_{14}CH_2OH$ — **White, waxy flakes**

"Lorol" 24 . . . a cetyl alcohol . . . is available in a National Formulary grade. "Lorol" 24 is insoluble in water; soluble in methanol, 95% ethanol, ethyl ether, and benzene.

Shipped in 125-lb. fiber drums.

"Lorol" 28

$CH_3(CH_2)_{16}CH_2OH$ — **White, waxy flakes**

"Lorol" 28 . . . a stearyl alcohol . . . is available in two grades—a technical grade for industrial purposes, and a U.S.P. grade. "Lorol" 28 is insoluble in water; slightly soluble in methanol, 95% ethanol, ethyl ether, and benzene.

Shipped in 50-lb. paper bags (industrial grade) and 50-lb. fiber drums (U.S.P. grade).

METHANOL

CH_3OH — **Clear, colorless liquid**

Methanol is one of the most versatile and reactive of all alcohols. Among its many important chemical reactions are its oxidation to formaldehyde and its reactions with organic and inorganic acids to form their methyl esters. It can be decomposed to provide a source of hydrogen and carbon monoxide. It is a solvent for many common resins.

Methanol is completely miscible with water, alcohols, organic esters, ketones, chlorinated hydrocarbons and petroleum ether.

Major uses of methanol include the manufacture of formaldehyde and many methyl esters; constituent of mixed solvents for many purposes, including finishes; solvent for the extraction of mercaptans from gasoline; solvent for the extraction of animal and vegetable oils; solvent in the manufacture of pharmaceuticals; ingredient of automotive and other anti-freezes.

Shipped from strategically located stock points in tank cars, tank transports, tank wagons and 55-gallon drums.

METHYL FORMATE

$HCOOCH_3$ — **Clear, colorless liquid**

Methyl formate is a low-boiling solvent with a pleasant odor, containing 97% of the ester by weight. It is soluble in water up to 30% by weight (at 20°C.), and is miscible with practically all organic solvents. It is a good solvent for cellulose ethers and esters, acrylic resins, and polyvinyl acetate. It is readily hydrolyzed to methanol and formic acid.

Other than its use as a solvent, methyl formate finds application in the manufacture of formates and other organic chemicals, including sulfa drugs. As an ingredient in fumigants, it is harmless and leaves no residual odor or taste.

Shipped in tank cars and 10- and 55-gallon drums.

PROPIONIC ACID

CH_3CH_2COOH — **Clear, colorless liquid**

Propionic acid is an organic acid, soluble in water, alcohol, and most organic solvents. It is used in the manufacture of cellulose propionate and mixed esters, in the manufacture of plasticizers for cellulosic esters, in the manufacture of ester solvents, and in fruit flavors and perfume bases.

Shipped in tank cars and 55-gallon drums.

OTHER PRODUCTS of the Polychemicals Department include:

Chemicals—Hytrol* 10 wood dye stain solvent, Mycoban* sodium and calcium propionates, Lucite* acrylic resin (methacrylate polymers), NuGreen* fertilizer compound, Uramon* ammonia liquors, Zerone* and Zerex* anti-freezes, Two-Sixty-Two* feed compound, Zytel* 61 nylon resin, Uramite* fertilizer compound.

Plastics—Zytel* nylon resin, Teflon* tetrafluoroethylene resin, Alathon* polyethylene resin, Lucite* acrylic resin, Tynex* nylon filament, Pyralin* cellulose nitrate sheeting, Plastacele* cellulose acetate sheeting, Butacite* polyvinyl butyral resin, Rulan* flame-retardant plastic.

*REG. U. S PAT. OFF.

Unmatched Experience

The manufacturing experience behind many of the chemicals made by the Du Pont Polychemicals Department is unmatched among chemical producers. Through the years, improvements in chemical processing technology have been applied so as to guarantee you the ultimate in product quality, purity, and uniformity.

Prompt Delivery and Service

It is our constant aim to make certain that your order is processed without delay and that delivery of product is made as promised. To provide the fastest service possible on such widely used products as methanol, industrial urea, "Hexalin" cyclohexanol, and "Hytrol" O cyclohexanone, a nationwide distributor organization has been set up with locations in most principal cities. Complete information on distribution and products is available from the district offices listed below.

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POLYCHEMICALS DEPARTMENT

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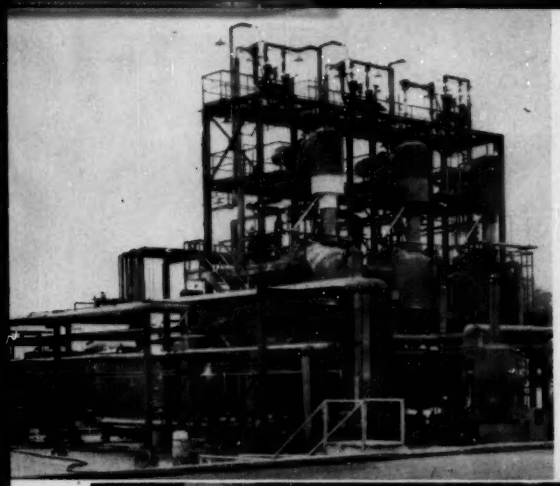
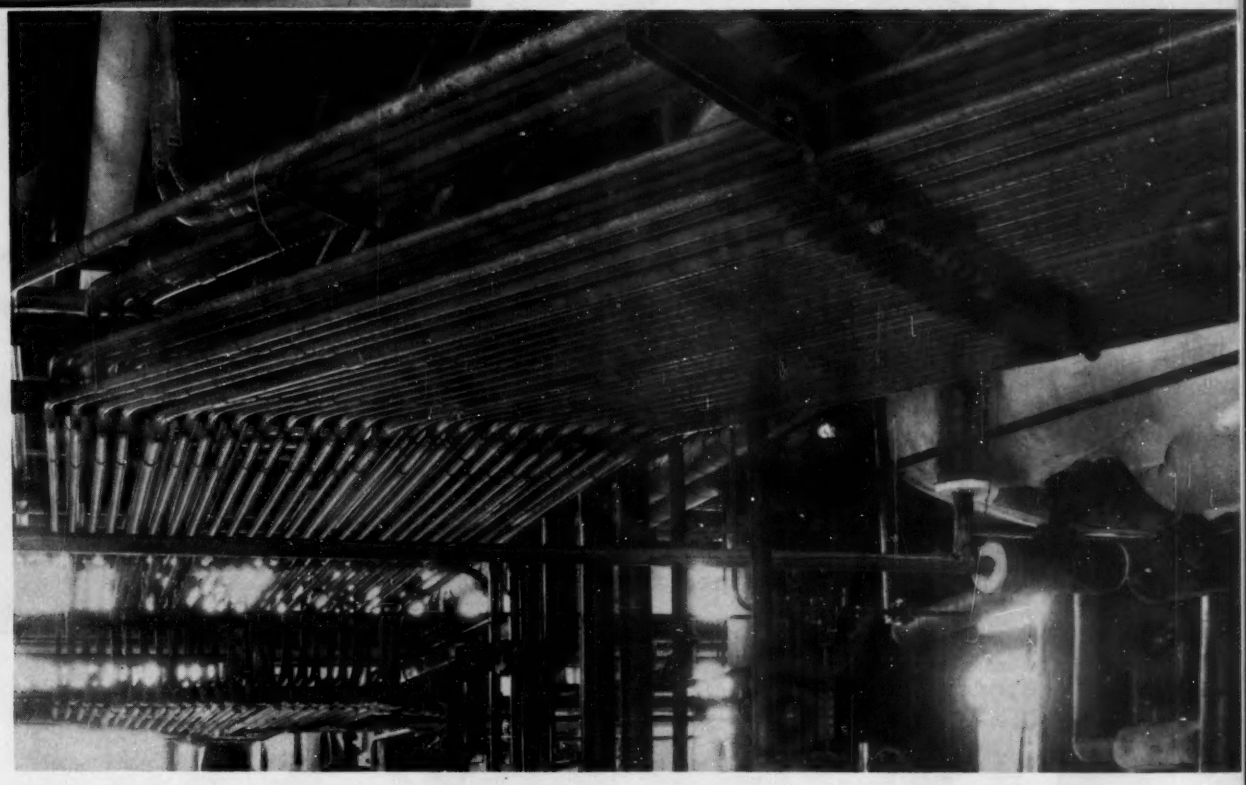


PRODUCTION

Only three reactors like those at left for 21 products. That's the plasticizer maker's typical lament.



Plasticizer Plant—Piped for Flexibility

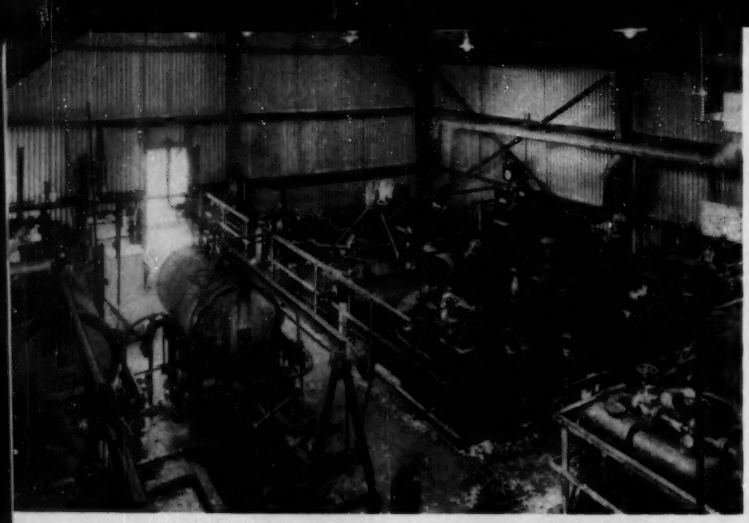
The most recent attempt to build versatility into plasticizer production is this brand-new multimillion-dollar Celanese plant at Point Pleasant, W. Va. It is turning out 21 phosphate-ester plasticizers, including several hydraulic fluids and tricresyl phosphate fuel additive; eight epoxy, polymeric and dibasic-acid ester plasticizers are being readied for 1957. All of this is happening on three production lines—and no one product is likely to account for more than a few million pounds of the plant's 20-million-lbs./year capacity.

It's typical of the plasticizer paradox in which big business is small business. The market is estimated at a substantial $100 million/year, but more than 600 products are out to get their share. To bite off a sizable piece, a plant must produce several products, keep equipment outlay to a minimum.

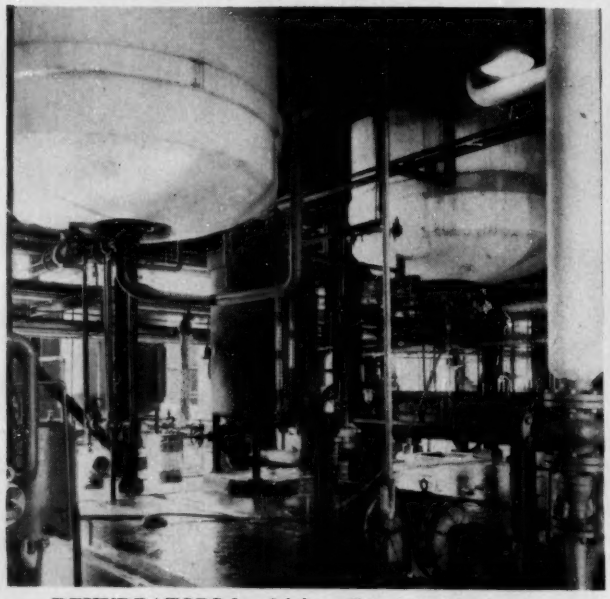
Piping Prodigy: Heart of the Celanese plant are two glass-lined and one stainless-steel reactors in which any of the required reaction conditions—temperature, pressure, agitation, refluxing, by-product gas removal—can be met. But it's the maze of piping arteries connecting practically every piece of process equipment in the plant that makes versatile operation possible.

Flow through the plant follows a general pattern of esterification in the reactors, then purification by flash distillation, washing and treating, filtration and dehydration. Yet each product requires handling at some point that makes processing different from others, complicates the flow pattern.

An alkyl phosphate plasticizer is flash-distilled to remove alcohol after

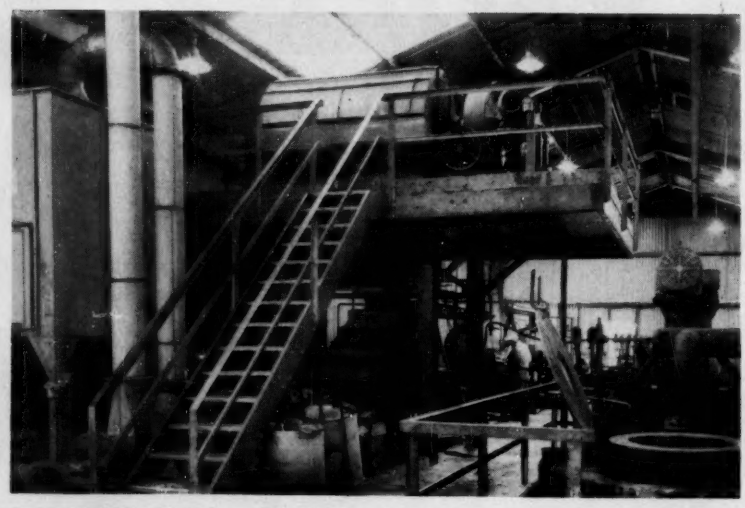


WASHERS, FILTERS are used for most products, as are . . .



. . . DEHYDRATORS for driving off last traces of water.

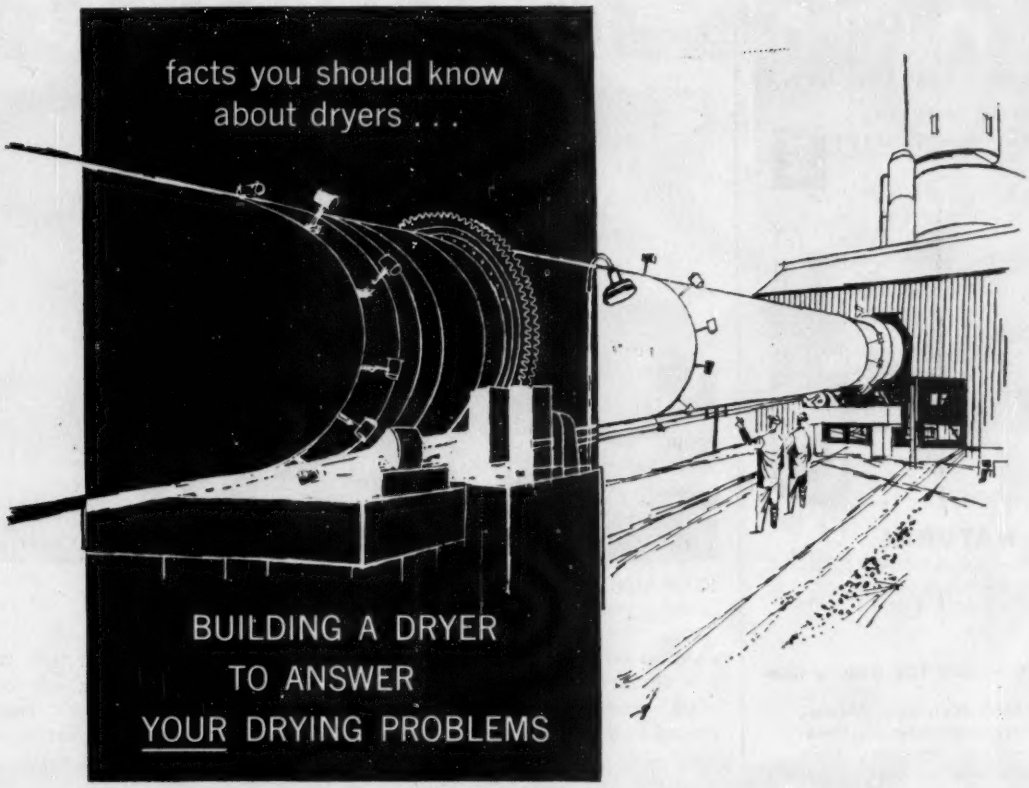
SPECIAL TOWERS are needed for TCP.



SPECIAL FLAKER is used for TPP, only solid product.

leaving the reactor. An epoxy-type plasticizer is washed with salt solution, then stripped to remove concomitant products after leaving the reactor. But the processing of both types would be similar the rest of the way—washing, dehumidifying and filtering.

Too, each product within a basic plasticizer type has its own process pattern. An alkyl (e.g., tripropyl) phosphate is formed by reacting propyl alcohol and phosphorus oxychloride under vacuum and with cooling. In the same reactor, an aryl phosphate (e.g., tricresyl phosphate) would be formed by reacting cresylic acid with phosphorus oxychloride at elevated temperature and moderate pressure. Both alkyl and aryl phosphates would be washed, dehydrated and filtered. But the aryl requires treating with activated



For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The following is intended as an introduction to selecting the right type of dryer.

Q. *Since my required production capacity indicates a continuous dryer will give lowest drying cost, which design is best for my purpose?*

A. Assuming the material is in bulk form, a rotary type dryer is best for your purpose. It is almost axiomatic that materials suited to drying in rotary dryers are dried at lowest *overall* cost in that type.

Q. *If I consider a rotary dryer, should it use high temperature furnace gases or low temperature warm air to dry my material?*

A. This will depend on your particular material, for instance—

1. The temperature to which it can be heated without injury.
2. The amount of moisture in the wet material.
3. The material temperature necessary to dry the material to the desired final moisture content.
4. Whether or not the material will be contaminated by contact with combustion gases.

Q. *I think my material will not be injured by gases from an oil furnace. Should I use a parallel or counter current rotary dryer?*

A. This will depend on a number of considerations, such as:—

1. Is the material flammable?
2. How dry must the product be?
3. Is the dried product dusty or is it granular with very small percentage of "fines?"
4. Will "case hardening" occur in high temperature atmosphere inhibiting uniform and complete drying of large lumps and particles?

Q. *There seems to be quite a number of conditions affecting the selection of the proper dryer type.*

A. Very true. And the conditions involved are not all included in the above discussion by any means.

Q. *How can I be sure of making the proper choice?*

A. An experienced drying engineer knows how to evaluate the various conditions involved in each drying problem and will make a sensible recommendation. If advisable he will also recommend pilot plant tests to confirm his conclusions.

Q. *How can I obtain such advice?*

A. Submit your problem to General American. An analysis and recommendation by a LOUISVILLE engineer entails no obligation on your part.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

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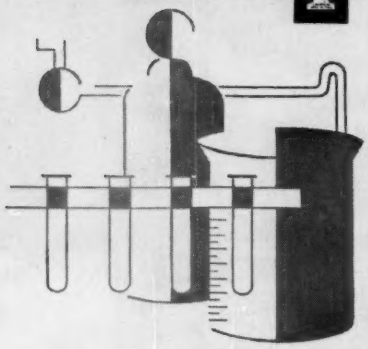

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IRISH MOSS—Used where highly soluble viscous mucilage is desired, such as cold water paint, shoe polish, leather and textile sizing. In natural, bleached or purified powder forms.

GUM KARAYA—A thickener in printing, finishing and sizing. Other uses: in pharmaceuticals as an emulsifier; in ceramic clays, candy and ice cream as a binder. Available in natural or powder form.

LOCUST BEAN GUM—A thickening agent for: textile printing and finishing, for food and pharmaceutical products, toilet preparations and cosmetics. Swells in cold water to give an extremely viscous solution. Also known, in a prepared solution, as Luposol (digested and filtered with all specks, flakes and other foreign matter removed).

GUM TRAGACANTH—Used in foodstuffs, textiles, pharmaceuticals, cosmetics, dentifrices, etc., wherever a thickening agent is necessary. All physical forms available: cracked, clean powder and filtered solutions.

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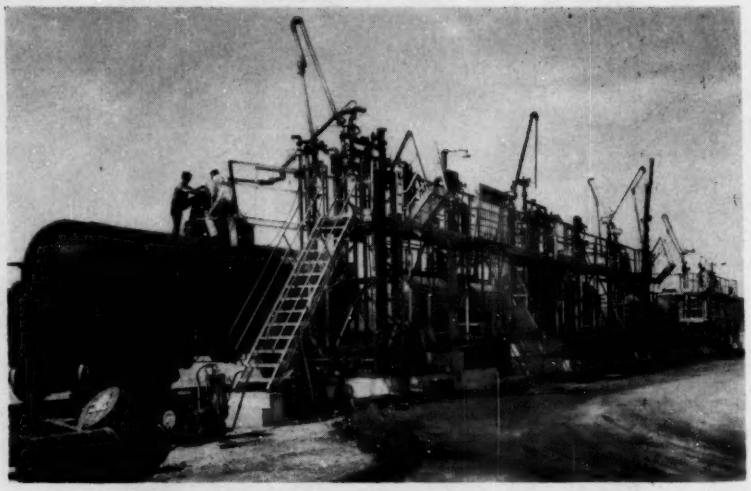


STORAGE AREA must be big to handle products prior to shipping.

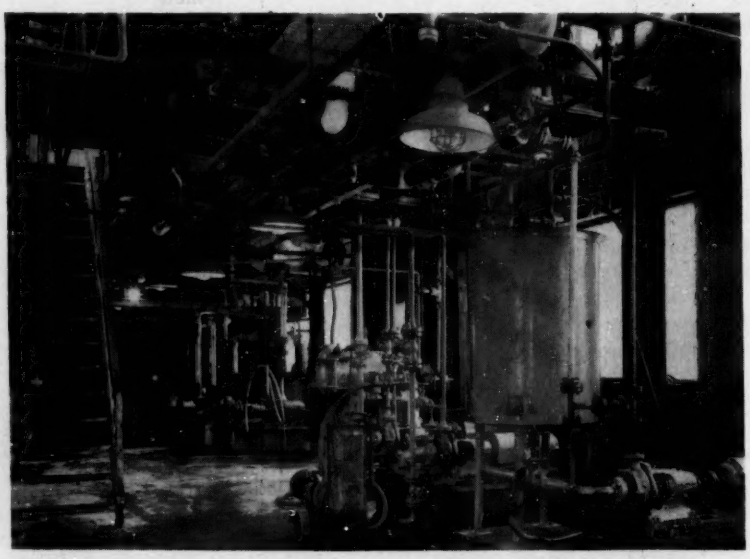
charcoal or other bleaching agent before filtration.

Chlorinated alkyl phosphates are treated in a special washing sequence since they cannot be flash-distilled. And dehydration takes place in a falling-film type of evaporator rather than a vacuum still. Also, no hydrogen chloride off-gas, an important by-product of aryl and other alkyl phosphates, is removed during the reaction stage.

Special Handling: In the washing and treating operations, water, caustic and permanganate washes remove impurities, form a separate layer, which is readily withdrawn from the wash tank. But at other times, usually with tricresyl phosphate, washing solutions form emulsions that aren't easily broken, and liquid-liquid extraction columns are used instead of tanks.

Tricresyl phosphate also often requires special narrow cuts of cresylic acid. The Celanese plant uses a 60-plate carbon-steel fractionation tower for this purpose. And triphenyl phosphate, the only product sold as a solid, requires a special drum drier for flaking.

Multiplication Problems: Production problems are increased with each of the basic plasticizer types—phthalates,



PILOT PLANT is sometimes pressed into service on small production runs.

CSC NITROPARAFFINS

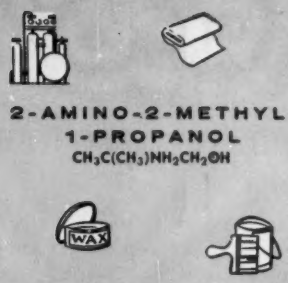
NITROMETHANE
CH_3NO_2

NITROETHANE
$CH_3CH_2NO_2$

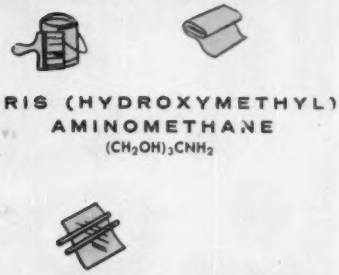
1-NITROPROPANE
$CH_3CH_2CH_2NO_2$

IMPROVING PROCESSES AND PRODUCTS

2-NITROPROPANE
$CH_3CHNO_2CH_3$



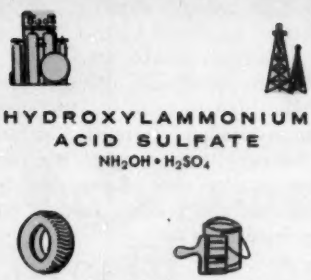
2-AMINO-2-METHYL-1-PROPANOL
$CH_3C(CH_3)NH_2CH_2OH$



TRIS (HYDROXYMETHYL) AMINOMETHANE
$(CH_2OH)_3CNH_2$

FOR AMERICA'S MAJOR INDUSTRIES

2-AMINO-2-METHYL-1, 3-PROPANEDIOL
$CH_2OHC(CH_3)NH_2CH_2OH$



HYDROXYLAMMONIUM ACID SULFATE
$NH_2OH \cdot H_2SO_4$

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Nitroparaffins and their derivatives are economical, effective, versatile chemicals for such uses as solvents . . . prime ingredients . . . raw materials . . . sensitizers . . . emulsifiers . . . analytical reagents . . . reducing agents . . . inhibitors . . . short-stoppers . . . surface activants . . . dispersants . . . anti-foamants.

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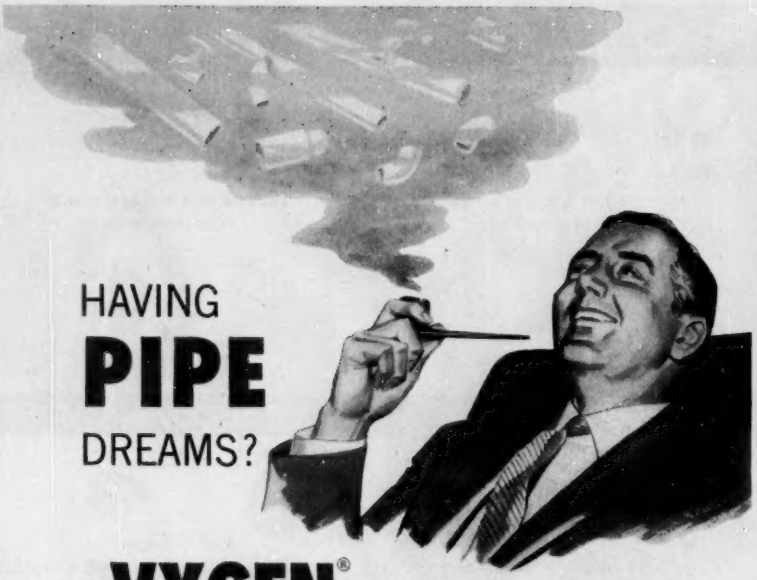

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If you're thinking about plastic pipe (and who isn't, since it's one of the fastest growing applications for rigid plastic) you should know more about Vygen 1101 and 1150, General's new rigid Type I vinyl compounds designed specifically for extrusion.

Vygen 1101 compound offers optimum chemical resistance without sacrificing impact strength, tensile strength or dimensional stability, and has excellent heat stability during processing. Vygen 1150 compound has all these characteristics, and is approved by the National Sanitation Testing Laboratory for transporting potable water.

The "built-in" color of your choice and flawless finish of Vygen 1101 and 1150 extrusions greatly reduce the high costs of old-fashioned duct and pipeline maintenance. For more detailed information on how these compounds can help you tap the rapidly-growing plastic pipe market, get your free copy of "Vygen 1101", a new 12-page booklet containing a wealth of technical data and test results. Just fill out the coupon or write on your company letterhead to:

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Chemical Division, Akron, Ohio.

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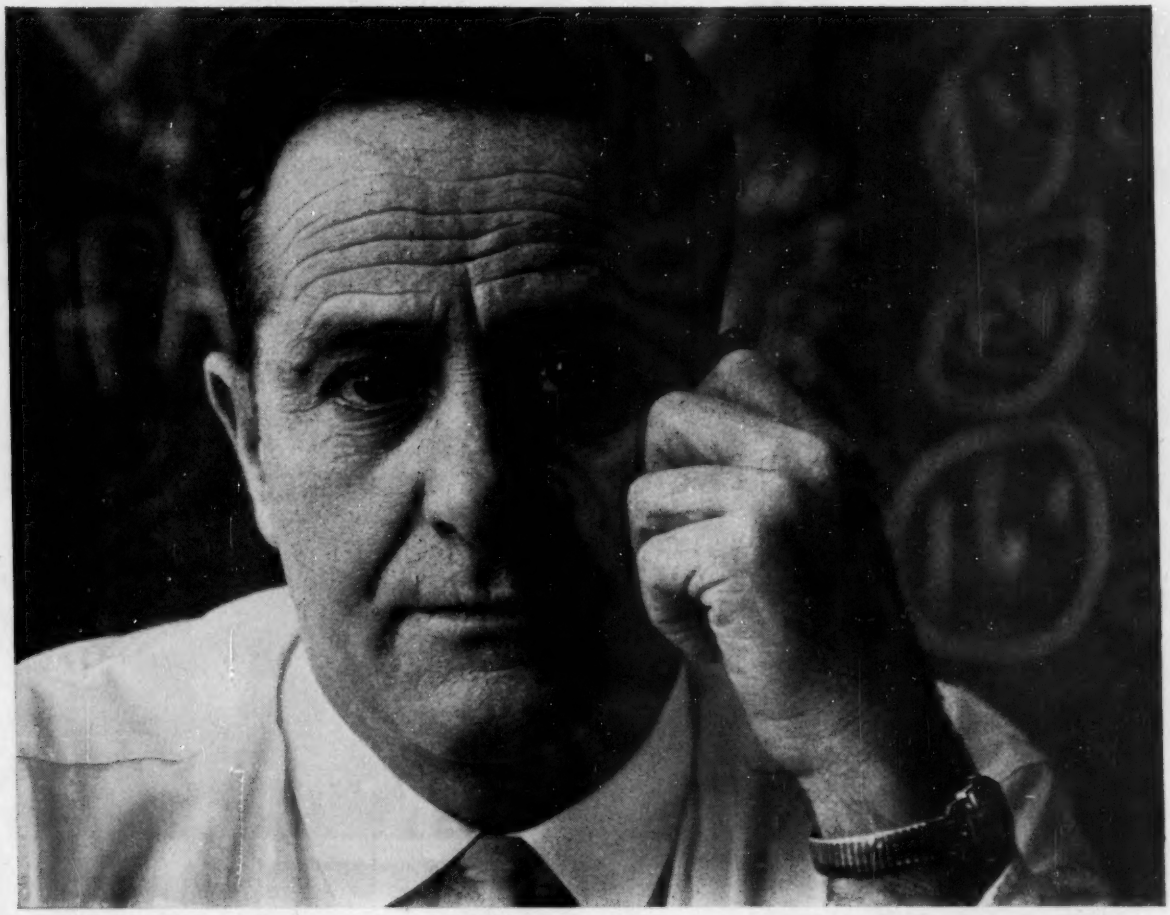
phosphates, epoxys, etc.— made. And although many plants, like Celanese, will turn out 20 or more products, few will concentrate on large production of more than two or three basic types. One dividing line is the phthalates. Accounting for more than 50% of the plasticizer market, they are made by procedures different enough to warrant equipment of their own. For example, Celanese at Point Pleasant concentrates on phosphates, is shying away from phthalates, while Monsanto at Everett, Mass., concentrates on phthalates. Major equipment modifications would be required for either plant to make both products.

Production men find small consolation in this concentration on basic types, however. The number of products within a basic type is still too large to make the job easy.

Continuous Ion Exchange

Many systems have been devised (CW, June 9, p. 74) to break the bottleneck of the regular shutdowns that are required for elution and regeneration of loaded ion-exchange resins. Newest attempt to bypass this process-interrupting chore is a system devised by a University of Tennessee engineering team for performing both the ion exchange and regeneration as the resin moves through a single column.

Development of the new technique was spearheaded by Professor Fred Peebles. Key to Peebles' new method is a tricky pressure-regulating system that permits both product stream and regenerant to be fed and withdrawn separately from isolated zones within the column. Regenerated resin is withdrawn continuously from the bottom of the column and returned at the top. In the upper zone of the column, resin is contacted by pregnant solution fed in at the center of the bed and leaving at the top. As the resin flows downward, it passes through an isolation zone and then into the regeneration zone. Regenerant is passed through the latter zone—entering slightly above the bottom of the column and exiting just below the upper isolation zone. After regeneration, the resin proceeds downward through a final isolation zone from which it is withdrawn for recirculation.



The Glycol Diethers bring out the best in our Mr. Rinelli . . . profit by it

Around Ansul we seldom see the *businessman* half of Bill Rinelli. He is usually so busy being Director of our Market Research and Development Division that this particular talent rarely comes to the fore. Some of our customers know differently. When working on a glycol diether application problem, Bill almost always wears two hats, *businessman* and *chemist*. He has helped to develop a number of marketable and highly profitable products using the glycol diethers. Examine these solvents carefully, then decide which Bill Rinelli you can use—businessman or chemist, or both. Write directly to him. Be sure to ask for a copy of our Glycol Diether Technical Bulletin. THE ANSUL CHEMICAL COMPANY, DEPT. C-11 MARINETTE, WISCONSIN.

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161	Triethylene Glycol Dimethyl Ether $CH_3(OCH_2CH_2)_3OCH_3$
181	Tetraethylene Glycol Dimethyl Ether $CH_3(OCH_2CH_2)_4CH_3$ (Dimethoxy Tetraethylene Glycol)
222	Ethylene Glycol Diethyl Ether $C_2H_5OCH_2CH_2OC_2H_5$

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a highly refined xylol alternate having a high Kauri Butanol solvency rating.

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a highly refined toluol alternate with a high Kauri Butanol value and fast drying qualities.

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Firm Name_____

Address_____

City_____ Zone_____ State_____

ESPESOL

STURTEVANT'S TROST: His opposed-jet mill is a . . .

New Find for a Hard Grind

A growing demand for large quantities of micron-size antibiotics, pigments, insecticides, plastics, metallic powders, etc., is creating new jobs for jet mills that specialize in superfine grinding. One of the newest applicants for the difficult job of reducing materials to smoke-size particles is the Jet-T-X mill now being readied by Sturtevant Mill Co. (Boston). Its novelty: use of two opposing jets to provide attritional impact.

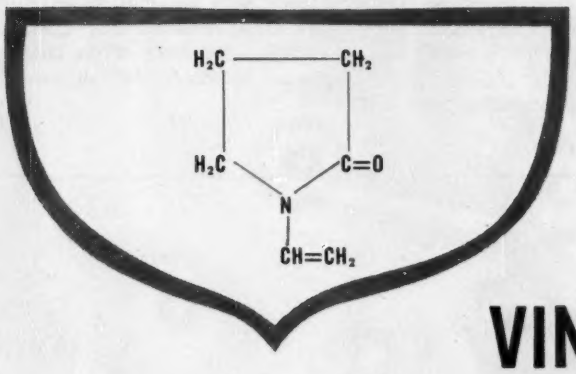
Commercial development of the new mill is under the direction of its inventor, Conrad Trost. A specialist in superfine grinding since the early '30s, Trost predicts that the novel principle employed in his mill may double or triple production capacities for the same power input required by conventional mills in use today.

Opposed Jets: Like other jet mills* (or fluid-energy mills), Trost's unit employs no moving parts, depends on violent impact of rapidly rotating particles for its pulverizing action. But unlike the other mills, which use from 4 to 16 tangential jets of compressed air, steam or inert gas to impart the rotational motion, the Jet-T-X uses only two opposed jets, which meet head-on in a tubular grinding chamber.

In its simplest form, the mill consists of a short grinding chamber connected near the ends to a horseshoe-shaped classifier loop. The material to be pulverized is fed by gravity from a hopper to a venturi, aspirated into one end of the chamber by a relatively low-pressure jet of secondary grinding fluid. The opposed jet of primary grinding fluid—entering from the other end of the chamber at substantially greater pressure—causes the particles to collide with tremendous impact.

Relative strengths of the jets are

*e.g., Sturtevant's new Micronizer line (*CW, *May 12, p. 64*); Reduction Engineering Co.'s Reductionizer; Fluid Energy Processing & Equipment Co.'s Fluid Energy Reduction Mill.



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Vinylpyrrolidone copolymerizes readily with styrene, maleic anhydride, acrylonitrile, acrylates, vinyl chloride, vinyl acetate and other vinyl monomers. Vinylpyrrolidone also forms addition compounds with phenols which might then be used in preparation of modified phenolic resins.

properties—Copolymer systems with Vinylpyrrolidone improve adhesion properties, dye receptivity, bonding strength, emulsification and complexing action, and solubility control in water and organic solvents.

If you make regular or pressure sensitive adhesives, printing inks, synthetic fibers, emulsion paints or glass fiber laminating resins, or work with copolymerization systems, send for technical information about Vinylpyrrolidone.

For technical information, price schedules and samples write to:

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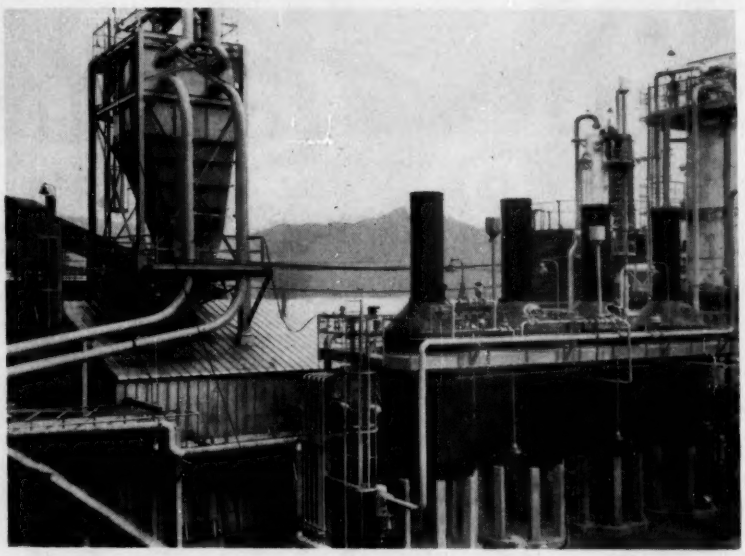
regulated so that the impact zone is adjacent to the classifier opening nearest to the product inlet. Following the path of least resistance, the pulverized material entrained in the grinding fluid passes into the classifier loop, where particle separation is accomplished by centrifugal force.

In the classifier, the product travels a circular path that changes gradually from square to trapezoidal cross section. A product take-off opening located about two-thirds of the way around the loop's inner surface permits material of required size to be carried out of the classifier by the grinding fluid. Oversize product continues through the loop, re-enters the grinding chamber immediately in front of the primary jet, which directs it back into the impact zone.

Sturtevant's development team will study other arrangements—e.g., multiple-feed jets, various classifier designs—covered by Trost's patent (U.S. patent 2,704,635).

Multipurpose Grinding: The jet mill permits the combination of other processes in addition to fine grinding—e.g., coating, blending, homogenization, chemical reactions—in the same operation. Jet-mill coating of clay, talc and other carriers with sulfur, fatty acids, resins or other chemicals increases the effective potency of the reagents by producing a larger surface area with a lower percentage of active material.

Though jet mills are still in their infancy, such dual-purpose versatility, says Trost, enhances their chance of qualifying for more of the chemical process industry's difficult grinding jobs.

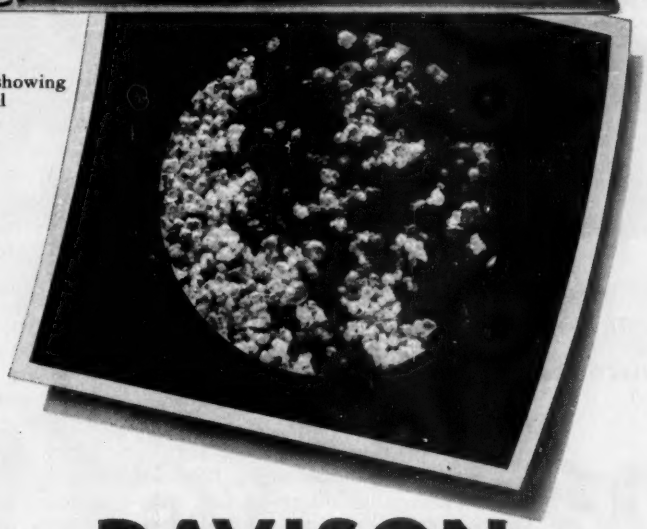


Backing Coal's Comeback

A MAJOR STEP toward coal's comeback as a chemical raw material (*CW, June 30, p. 76*) is Olin Mathieson's new synthesis gas plant (*above*), which has just started up. Located in the heart of the coal country at Morgantown, W. Va., it's the first commercial-size unit to employ the Texas Co.'s process for the partial oxidation of solid fuel. Coal-handling equipment (*left*) and gasifier apparatus (*right*) are designed to produce enough synthesis gas to manufacture 80 tons/day of ammonia or equivalent methanol. If all goes well in this plant, additional units of the same size will be built for large-scale production.

The OM unit is the only one using partial oxidation of coal; Du Pont's Belle, W. Va., plant recently switched to natural gas.

PROGRESS THROUGH CHEMISTRY



Photomicrograph showing Davison's Hydrogel enlarged 20 times actual size.

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Davison Engineers have a long record of working with manufacturers in the development of new products as well as solving problems on products currently in production. One such case is the use of Davison's Code 91 Hydrogel for imparting porosity in rubber products. This application required a product of high purity with a narrow total volatile control. The particle size had to be of definite consistency and a close control of the pH range was required. Davison Engineers worked on the problem with the manufacturer and developed Code 91 Hydrogel which is being used successfully and economically to meet the rigid specifications.

This is only one of the many cases in which Davison Engineers have been able to help a manufacturer solve a problem.

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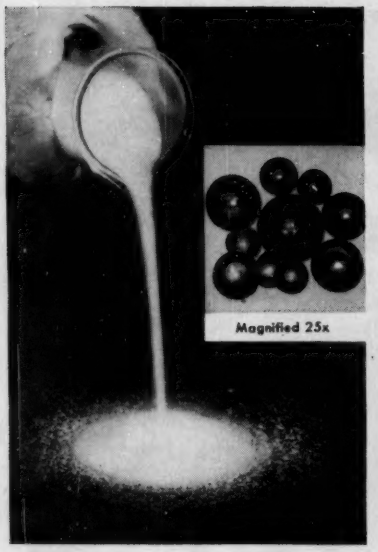

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PRODUCTION

EQUIPMENT

Partition Chromatograph: Fisher Scientific Co. (Pittsburgh, Pa.) is out with the new Mark II Fisher-Gulf Partitioner for gas-liquid partition chromatography. Operating range is 35-160 C with carrier-gas flow rates up to 100 ml./minute. The thermal conductivity cell and heater assembly are plug-in units, simplify interchange of separation columns. Too, the separated components of a mixture are exhausted as soon as they pass through the detector. The Mark II, it is claimed, will make a full analysis of a multicomponent system in minutes.

•

Ultrasonic Generator: The Multi-whistle RD Air-Jet Ultrasonic Generator, developed in France, will be produced in the U.S. by Gulton Industries, Inc. (Metuchen, N.J.). It's aimed for fog dispersal, radioactive waste disposal, concentration of fissionable ores, precipitation of aerosols and dust particles, cleaning, sterilization, and mixing of paints. Now used in Europe as a high-intensity sonic-energy source—range: 4-40 kc.—the generator will operate in gases, liquids and corrosive atmospheres, temperatures to 700 C. Gulton is now readying a unit for experimental industrial studies.

•

Thermostatic Traps: A new series of thermostatic steam traps is offered by the Clark Mfg. Co. (Cleveland, O.). The traps are designed for wide variations between startup and operating load, frequent shutdowns and startups. Large amounts of air are eliminated, freeze-up danger is reduced, it's claimed. Traps are available for steam pressures to 300 psi., temperatures to 500 F, inlet and outlet connections from ½ to 2-in.

•

Plug Valve: Circle Seal Products Co., Inc. (Pasadena, Calif.), says its new plug valve provides leakproof shutoff, eliminates adjusting nut and springs through the use of three "O" rings. The valve—made of brass, with ¼-in. female connections—is operated by a handle that opens and closes against pressure.

•

Check Valve: A new polyvinyl chloride check valve intended for corrosive gases, vapors and liquids is available from Techno Corp. (Erie, Pa.). It's also recommended for salt solutions, fuels, oils, acids, alkalis and alcohols. Sizes: 1 to 8 in. with standard flange or socket ends; 1 to 4 in. with male threaded ends.

•

Tube Inspector: The Magnatest FW-400 is a new automatic, electronic inspection unit made by Magnaflux Corp. (Chicago) for detecting flaws in nonmagnetic tube, rod, wire and bar. The unit will inspect materials such as aluminum, brass, copper, tungsten, austenitic stainless, and titanium in diameters from 1/64 to 3 in. It will operate at speeds above 300 fpm. on cut or continuous lengths, can be equipped with automatic recording and signaling devices.

•

Digital Indicator: Performance Measurements Co. (Detroit) features a new digital indicating instrument for direct reading of signals from a variety of transducers. Tagged Model 756, it linearizes inputs by means of a tapped slidewire, feeds output directly to panel digits 7/16 in. high. The digital indicator is recommended for variables such as temperature, pressure, load, speed and flow that can be translated into an electrical quantity.

•

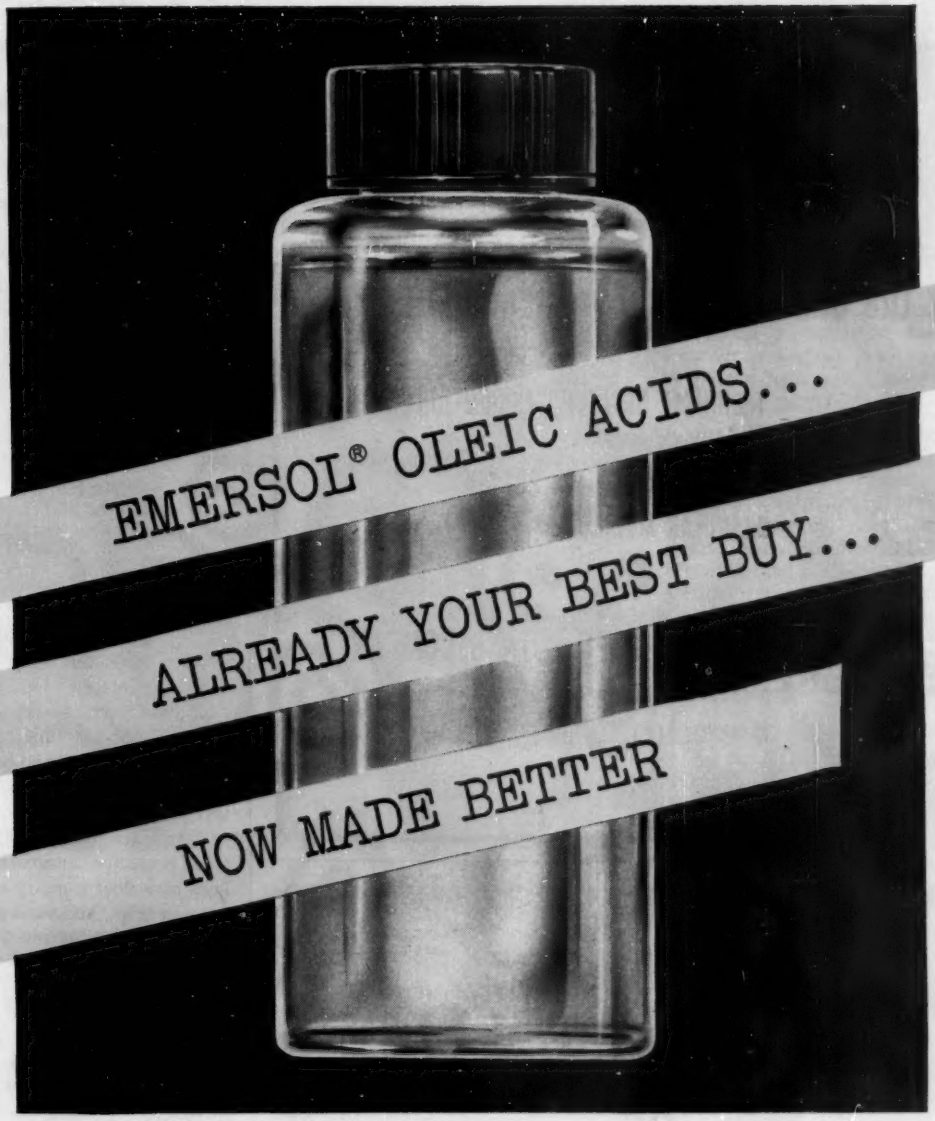
Control Valves: Black, Sivalls & Bryson, Inc., is out with a redesigned line—its Super 70 Series—of diaphragm control valves. New topwork features a molded diaphragm designed to give uniform thrust over full valve travel, comes in direct- or reverse-acting styles in four sizes. New bodies have been engineered to provide greater stability and more-exacting flow characteristics, come in single-port, double-port and split-body styles.

•

Drying Combination: The new combination of drying principles employed in its Rota-Cone vacuum drier, says Paul O. Abbe, Inc. (Little Falls, N.J.), permits fast, but gentle, drying of a broad range of materials. Conical shape of the unit is designed to provide a cascading-tumbling action for uniform drying, intimate blending; use of high vacuum speeds drying at modest temperatures. Rota-Cone units are supplied in operating capacities of 1 to 325 cu. ft.

•

Rubber-Lined Pump: A new rubber-lined, side-suction centrifugal pump



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for handling nonoxidizing acids and solvents has been designed by The Deming Co. (Salem, O.). It includes a rubber impeller and stainless steel shaft, is suggested by the maker for handling lactic, maleic and sulfuric (to 50%) acids, aluminum sulfate and fluoride, ammonium hydroxide, sulfate, sulfide, chloride and fluoride.

•

Punched-Tape Duplicator: A new punched-paper tape regeneration unit of Commercial Controls Corp. (Rochester, N.Y.) duplicates 5-, 6-, 7- and 8-channel tapes at the rate of 20 codes/second, produces a composite tape of all the information recorded on individual tapes to speed up computer processing. The unit consists of a motorized tape punch connected by cable to a motorized tape reader.

•

Mist Separator: The V. D. Anderson Co. (Cleveland) is out with Model LUS Hi-eF Purifier for the recovery of solids and liquids vented to the atmosphere. Vanes and baffles separate liquids and solids from gas or vapor through centrifugal action. No screens or filters are used. Separated entrainment is ejected automatically—on gas lines by a float trap, on steam lines by a steam trap. Anderson guarantees removal of 99% or more of all liquid and solid particles under normal operating conditions.

•

Filter Felt: Designed for plate and frame filtration of aniline dyestuffs and pigments is American Felt Co.'s (Glenville, Conn.) new nonwoven felt. Called Dynel Windsor Felt, it's made of dynel combined with a thermoplastic-binder fiber. Claims: rapid wettability, quick cake formation easier cake release, up to 10 times longer life than cotton at only 2 or 3 times the cost. Its tensile strength is 2,400 psi.; operating temperature range is —20 to 150 F without shrinking. The felt tolerates most strong acids, alkali and salt solutions, solvents.

•

Pocket pH Meter: Scientific Instruments Division, Beckman Instruments, Inc. (Fullerton, Calif.), is out with a new pocket-size pH meter. A single electrode combines both reference and glass electrodes. The meter has a pH range from 2 to 12 and a memory dial for use in standardizing. It operates from flashlight batteries.

(ADVERTISEMENT)

SPECIALTY MARKET BUILDERS *(from Monsanto)* . . . . . .

Santowax: Money-Saving Sleeper

With the "re-discovery" of waxy terphenyls—profit prospects in wax preparations shine brighter than ever. Here, wax users find, is that hard-to-find cost-cutter they've been looking for.

During the war, when the galaxy of available waxes dwindled to a few scattered stars, the waxy terphenyls came into their own. A spate of development in a dozen industries carved out several dozen places for these waxy solids that formulators are reviewing today—with an eye to analogous uses in applications that didn't exist in the early forties. Reason for the interest is: terphenyls are cheap, particularly if you can make do with a mixture of the isomers.

A mixture of *ortho-*, *meta-*, and *para-*terphenyls—sold by Monsanto under the trade name Santowax* R—is a light-buff, crumbly, waxy solid that has unusual stability to heat, acids, and alkalis. Most important, Santowax R is highly soluble in cheap solvents such as benzene or trichlorobenzene, is compatible with many expensive waxes. For these reasons, wax users find it's a money-saving extender for higher priced waxes, and a good modifier for wax blends. Its presence, for example, increases the chemical resistance of wax-base coatings and sealants, improves the electrical characteristics of wax impregnated insulation. Santowax R, itself, has a volume resistivity of 35,000 x 10^9 ohm-cm at 135°C.; a dielectric constant of 2.58.

Where the interest is beginning to broaden, however, is in the fields of adhesives and packaging. In waxed papers, reports one researcher, the presence of as little as 5% Santowax R in a .003" film reduces the moisture vapor transmission of the wrap *between 7 and 11 times*. In delayed-action, heat-sealing coatings, Santowax R acts as a solid plasticizer, and this same plasticizing action is also useful in a variety of hot-melt coatings.

Where one big market looms is in candlemaking, and several wax processors have shown interest in separating out the isomers for this special use. When the *ortho*, *meta*, and *para* isomers are separated from Santowax R—they fling open doors to a dozen special markets.

The *para* isomer has one of the highest melting points (213°C.) of any of the sharp melting point commercial waxes. It is one of the best-known opacifying agents for altar candles and raises the drip-point temperature for table candles. This high melting point puts it in high favor as an impregnant for electrical coils.

The *meta* isomer has a lower melting point (90°C.) but the presence of just 1% in candle compositions increases the miscibility between paraffin and beeswax, allows the candlemaker to use a cheaper grade of paraffin, and eliminates blisters and surface roughness.

The reason many formulators are dusting off the terphenyl waxes is not a change in their composition or availability—but the new requirements of wax applications today.

For more facts on Santowax and Actamer* (below), write today. Lab-size samples on request. Please do not request special formulations or reveal your formulation to us since this is your private, often most valuable, property. Write: Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Dept. CS-2, St. Louis 1, Missouri.

*Reg. U. S. Pat. Off.

Industrial Soaps: New Sales Pull

Although it was reported (CW, Apr. 16, '55) bacteriostat-boosted soaps now total a fifth of the toilet-bar sales—the *fastest* acceptance has been in the field of specialty soaps. In the last year, some 21 makers of industrial powdered and liquid soaps and creme hand cleaners have added Monsanto Actamer to their products. Apparently, safety engineers in industrial plants see real value in removing resident skin bacteria, thus lowering chances of secondary infections from cuts and scrapes. The preparations with Actamer sell readily to antiseptic-minded buyers. Effectiveness of Actamer in degerming is attested by the toughest market of all: surgical soaps. Six companies have found soaps containing Actamer make the most effective scrub-up for doctors.

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target

Bactericides To Boost Oil Recovery

CRUDE OIL producers engaged in secondary recovery of oil by water-flooding are looking to chemical firms for a compound that will eradicate, or at least render inactive, sulfate-reducing bacteria found in the soil of many oil deposits. These bacteria cause oil formations to plug up, thus prevent further profitable recovery of oil. And they increase corrosion in pipelines.

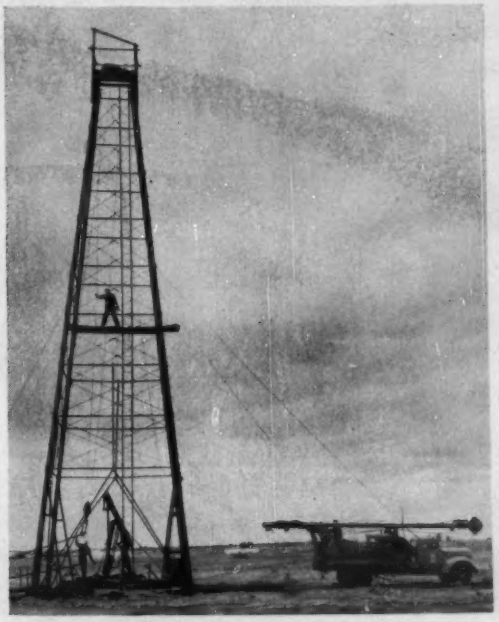
Today, water-flooding—a process of injecting water into a petroleum reservoir to force out crude that's trapped in the interstices of the formation—is easily the most important secondary recovery technique. It is used to recover about 130 million bbls. of oil annually. This is almost 5% of total U.S. crude production of 2.5 billion bbls./year. And if predictions by oil experts prove correct, water-flooding production by 1980 will rise to 750 million bbls./year—25% of total U.S. crude production.

Active Interlopers: While many species of bacteria may be active in injection waters, most investigators have concluded that sulfate-reducing bacteria, *desulfovibrio desulfuricans*, present the greatest problem. They reduce sulfates (present in the water chiefly in the form of calcium and sodium sulfates) to form hydrogen sulfide, which attacks the iron in the piping system to form ferric sulfide. This, in turn, plugs up the formations, causes water penetration to drop to zero in many cases.

An obvious way to stem the growth of these microorganisms is to introduce bactericidal materials into the water. Ideal chemical for the job would be:

- Active against all strains of sulfate-reducing bacteria.
- A compound to which bacteria won't develop resistant strains.
- Unreactive with other materials in the oil-containing formation.
- Easy to handle in the field. Preferably, it should be a liquid that comes ready to use, rather than a solid that must be put into solution. And, it should be nonirritating, safe to handle.
- Economical. Rough estimates put the preferred cost range at 2-5 mils per barrel of water treated.

What's at Stake: For the right chemical there's a lucrative market. But because of the variables, the market is difficult to calculate exactly. Estimates vary from $500,000 to $7 million. Other estimates put the market at 5-6 million lbs. by '57; and, as secondary oil recovery gains momentum, 10-12 million lbs. by 1962.



AT WELL: For higher recovery, a bacteria bane.

Among chemical firms researching the problem is Carbide and Carbon Chemicals (division of Union Carbide and Carbon) which recently introduced glutaraldehyde (an acrolein derivative) for the job. Carbide claims the product is effective in low concentrations, easy to handle, has a pleasant smell. Still uncertain, however, is whether it is effective against all strains. Field trials are continuing.

Another hopeful is Tret-O-Lite Co.'s (St. Louis) X-Cide-333, a high-molecular-weight nitrogen-containing organic. But like all high-molecular-weight organics it can preferentially dissolve in the oil phase, can create an additional separation problem.

Antibiotics (e.g., chlortetracycline) are also under evaluation. So far, though, they appear to be too expensive for general use.

Currently used materials include: National Aluminate's Nalco-321, an amine; Dow's Dowicides F and G, polychlorinated phenols, and Dowicide K5, methylene bis-chlorophenol; Armour Chemical's Arquad quaternary compounds, Armeen fatty amines, Armac amine salts, Ethofat and Ethomine nonionics, and Duomine reaction products of primary amines and acrylonitrile.

Judging from the amount of effort put into the project, chemical firms should soon have the solution of this oil producers' problem.

GISELA AND GERALD OSTER: Local viscosity is what counts in their . . .

Polymerization Speed-Up

Vinyl makers may soon be beating a path to the Polytechnic Institute of Brooklyn if the results of early research by a man-and-wife team live up to promises. Gerald Oster, associate professor of polymer chemistry, and his wife, Gisela, have discovered that the use of glycerine can significantly speed up polymerization reactions—without any sacrifice of molecular weight.

Traditionally, a speed-up in polymerization rate means a lowering in molecular weight of the end-product. But the Osters have been able to cut the time of acrylamide polymerizations from hours to a few seconds. At the same, time, they've obtained 100-fold increases in molecular weights. They have, in fact, turned out polyacrylamide with a molecular weight as high as 20 million.

Right now, however, Oster cautions that all results have been on a bench scale and no effort has been made to verify them on a larger scale.

Proving Their Point: So far, the Osters have worked mainly on acrylamide because, being soluble in both glycerine and water, it's easy to work with. But they are confident that the technique will apply to other vinyl polymerizations. They're now working with other compounds to prove it.

Oster explains the principle this way: Vinyl monomers (like many others) can be polymerized by a number of catalysts that produce free radicals. The polymerization goes forward in three stages—initiation, propagation and chain termination. Glycerine added to the system increases the viscosity, reduces the rate of chain termination and allows high polymers to form more rapidly.

But why does glycerine work while other thickening agents don't? Oster points out that glycerine increases the viscosity of the medium immediately surrounding the molecules (local viscosity). This, in effect, puts up a barrier around the individual chain-terminating groups to give the chains more time to react with monomers and thus to produce higher-molecular-weight compounds.

Most of the high-polymer thickening agents (e.g., gelatin, polyvinyl alcohol), on the other hand, increase the viscosity of the entire solution (macroscopic viscosity). This does not affect the relative rate of chain termination unless very high concentrations (99%) of thickening agents are used.

Part of the Plan: The Osters got interested in the use of glycerine through other studies in which reaction rates depend on viscosity. In all cases, the Osters found that only with glycerine did the reaction rate increase.

In the acrylamide work, Oster also used a principle taken from one of his previous discoveries—that vinyl monomers would polymerize in the presence of certain dye-reducing-agent combinations (e.g., riboflavin) when irradiated with visible light.* In this technique, they employ riboflavin (in concentrations of less than 0.01%) and visible light as catalysts. In fact, a patent has been applied for to cover the dye-sensitized photopolymerization. And one of the claims deals with glycerine's speed-up effect.

As conversion increases in photopolymerization of acrylamide, Oster reports, the reaction accelerates. This is due to the gel effect. When the light source is removed, Oster says, polymerization still continues, although at a slower rate than in light.

To date, the Osters have concentrated on obtaining reaction data for acrylamide polymers converted up to 10% completion. But in less formal work, they've gone to essentially complete conversion (above 90%). Oster says that as yet they haven't worked intensively at higher conversions because the kinetics become more complex above the 10% level. And they're interested in putting basic data together first before working toward higher yields.

Although considerable basic work remains before the actual value of the Osters' work can be realized, Oster is convinced that their efforts mark a significant step forward in putting a "better handle" on the control of polymerization reactions.

* Results of the kinetics of dye-sensitized photopolymerization of acrylamide were reported by the Osters at the Atlantic City meeting of the American Chemical Society in Atlantic City last month.

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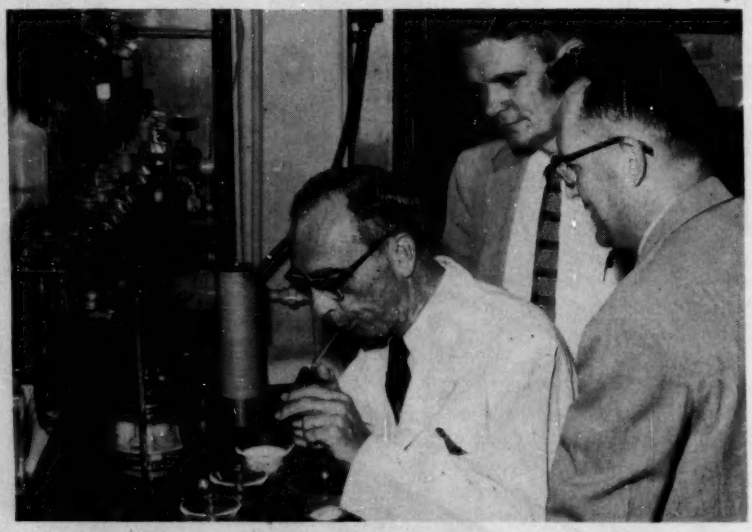

PART-TIMER PROTAGONISTS*: For idea men, time to shine.

Time Out for Research

Nonresearch personnel at Convair (San Diego, Calif.) division of General Dynamics Corp. may play an important role in the firm's current research expansion plan. In an unorthodox move, Convair is setting up laboratory facilities for non researchers' use, will let selected applicants work part time on scientific projects of their own choosing and which they themselves will initiate.

Object: to tap into the pool of ideas held by other staffers, and give them the satisfaction of putting such notions to the test.

Credit for the new plan goes to Charles Critchfield, Convair's director of scientific research, and Thomas Lanphier, vice-president and assistant to the president on long-range planning. It falls under Convair's new general scientific research program established by President Joseph McNarney. Critchfield is being assisted in setting up the part-time program by Robert Rowe, chemistry professor at San Diego State College, and full-time research staffer Cecil Langford.

Stay-at-Homes: Under this new program, still in its infancy, the part-timers will be detached from their regular duties for a period to carry on their research either in the special laboratories or in areas in which they are regularly employed. This will depend largely on the nature of the project.

Critchfield feels that in many instances—perhaps most—the man engaged in "pure" (rather than "applied") research will work in his own facilities. But he concedes that in many cases, researchers will want to spend some time on special phases of their work in the new part-time laboratory facilities at San Diego and Fort Worth.

The amount of time devoted to a project will also vary. In some cases, research will be carried on for one or two days a week, regular duties the rest. There will be no extra compensation involved. But there won't be any extra working hours either.

Convair's big interest right now is in basic research—explorations in gas dynamics, aerodynamics, theoretical and experimental physics, physical chemistry, mathematics and metallurgy—essential to development of the airborne vehicles and electronic systems that the firm makes.

Significantly, one of the first projects to be approved for part-time research is a basic chemical project. E. L. Gray, an engineering department chemist at Convair in Fort Worth, Tex., will probe the thermodynamic properties of metallic sulfides, has been allotted 500 hours for this investiga-

*Left to right: Langford, Critchfield, Rowe.

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Sub-micron fumes are the **really tough** gas cleaning problems. These fumes cannot be economically or effectively controlled by conventional cleaning devices.

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The table lists some of these commercial installations. All of these **really tough** problems and many more are being solved with complete satisfaction to users of P-A Venturi Scrubbers.

PROCESS	DUST OR FUME	INSTALLED CAPACITY CFM
Incinerator—Flue Fed	Fly Ash	32,000
Incinerator—Sodium Disposal	Na_2O	9,000
Incinerator—Industrial	Radioactive Dust	6,000
Dry Ice & CO_2 Plants	Amine Recovery	72,400
CO_2 Gas for Process	Fly Ash	500
Boiler Flue Gas	Fly Ash & SO_2	4,300
Enamel Frit Furnace	Dust & HF	11,900
H_2SO_4 Concentrator	H_2SO_4	49,800
Copperas Roasting	H_2SO_4	34,250
Cobalt Ore Roasting	H_2SO_4	65,000
Chemico Wet Type Acid Plant	H_2SO_4	41,000
Chloro-Sulfonic Plant	H_2SO_4	600
Phosphoric Acid Plant	H_3PO_4	91,900
Phosphoric Acid Concentrator	H_3PO_4	194,000
Phosphor Copper Furnace	H_3PO_4	15,000
Smelting—Non-Ferrous		
Blast Furnace	Lead & Organic	12,000
Reverb. Furnace	Lead Compounds	23,500
Comb. Blast & Reverb.	Lead Compounds	7,000
Brass Furnace	Zinc Oxide	7,500
Ajax Furnace	Beryllium Fumes	4,000
Steel Plant		
Oxygen Steel Process	Iron Oxide	140,000
Blast Furnace	Coke & Iron Oxides	788,000
Zinc Sintering	Zinc Oxide	75,000
Wood Distillation	Tar Products	3,500
Na_2SiF_6 Dryer	SiF_4 & Dusts	700
Iron Chloride Concentrator	$FeCl_2$ & HCL Mist	40,000
Unknown	Carbon Black	1,700
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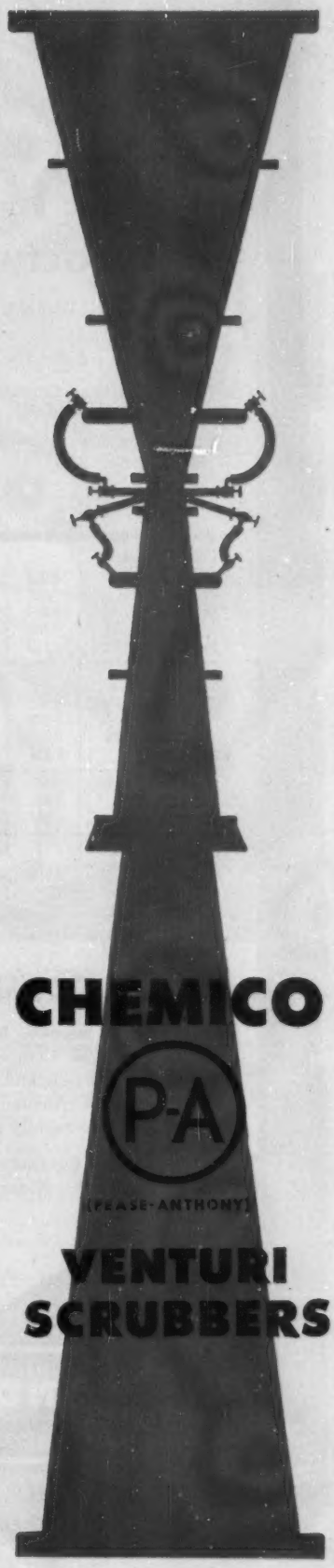
Carbide Furnace	Metal Oxides	1,000
Asphalt Plant	Rock Dust	80,000



Write to our P-A Sales Department for Bulletin M-102 describing the simple operating principle of the P-A Venturi Scrubber, and Bulletin M-103 explaining its metallurgical fume applications in the steel industry.

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	Sp. Gr. 20/20°C	Pour Point °C	Viscosity Centistokes 20°C	Temp. (°C) for 1000 stokes Viscosity
Mono-esters of:				
Octanoic Acid	0.862	−73	5.0	−73
Pelargonic Acid	0.865	−57	5.4	−73
Capric Acid	0.863	−57	6.9	−73
Lauric Acid	0.863	−32	9.5	−73
2, 4-D Acid	1.153	−40	59	−32
Di-esters of:				
Phthalic Anhydride*	0.981	−48	74	−42
Succinic Acid	0.933	−73	16	−64
Maleic Anhydride	0.940	−65	21	−58
Adipic Acid	0.928	−73	18	−70
Azelaic Acid**	0.917	−73	25	−69
Sebacic Acid**	0.915	−65	27	−68
Diglycollic Acid	0.962	−65	30	−53
Tri-ester:				
Phosphate	0.910	−73	17	−68

* "DIOP" is an outstanding all-purpose vinyl plasticizer, now approved for non-toxic applications as in food wrappings.

** "DIOA" and "DIOS" are applicable in vinyl formulations for low temperature applications.

Contact your supplier for samples of these esters. INDOIL Chemical Company does not manufacture esters, but the outstanding esterification quality of INDOIL Isooctyl Alcohol makes it an unexcelled source for these rapidly growing products.

Send for INDOIL Technical Bulletin No. 22 for further data.

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tion during the next fiscal year. This will amount to about one-fourth of his total working time for Convair during that period. Gray, however, is no stranger to lab assignments. His regular post is project leader in the development of X-ray diffraction techniques for the study of aircraft materials. Gray will use his own laboratory facilities, with Convair's research department monitoring the work and furnishing any special equipment needed. His project is expected to require about two years on the 500-hours/year basis.

Just how the new plan will fare is hard to guess. Critchfield's opinion: "Right now it's an experiment. It may take a year or two to determine whether or not it is any good."

Mental Drug Meet

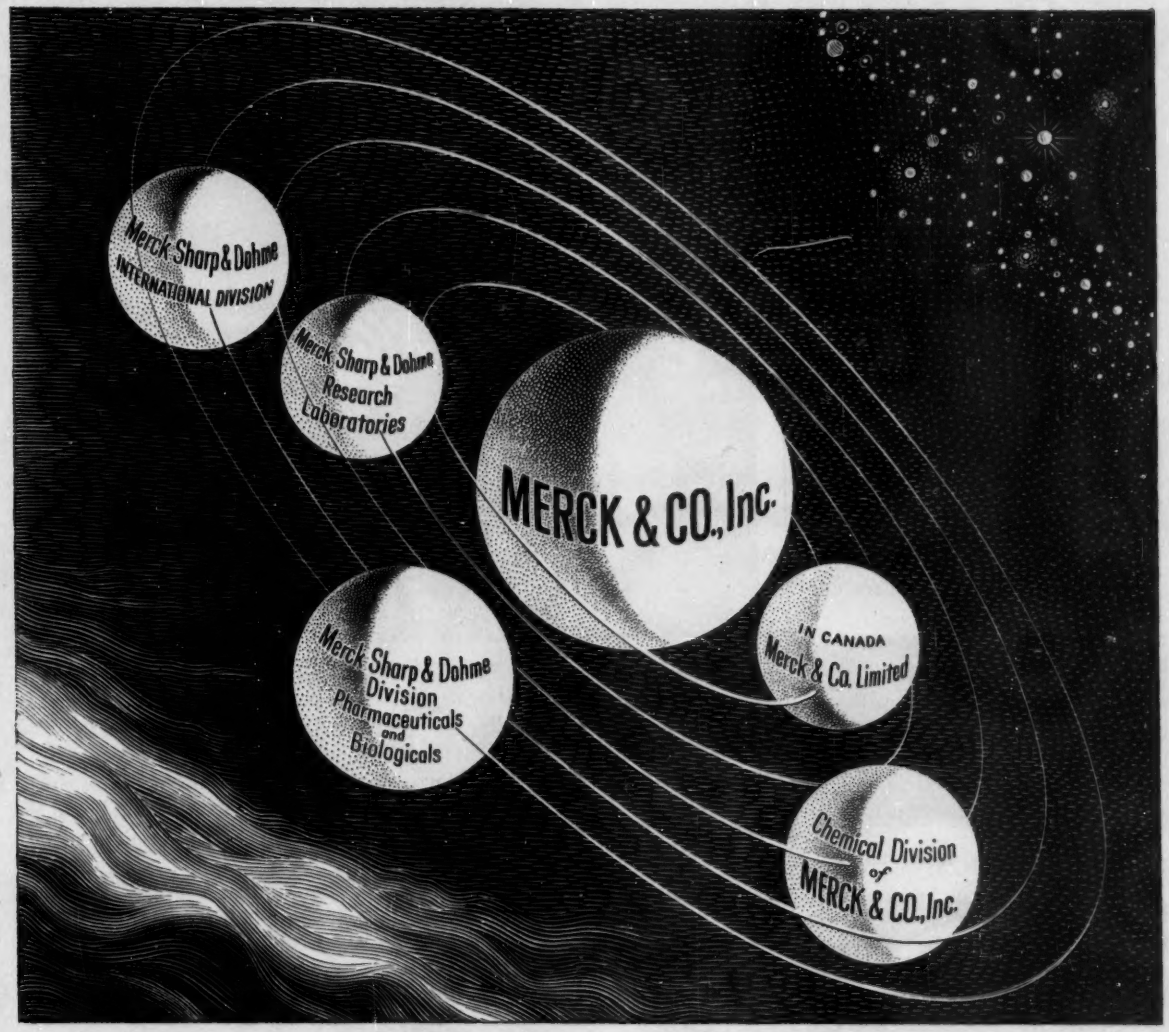
Next week, in a special conference called by the New York Academy of Sciences, physicians and scientists will get another chance to weigh the evidence for and against tranquilizing drugs. Unlike the recent National Institute of Mental Health gathering in Washington *(CW, Oct. 6, p. 70)*, the meeting will be purely technical in its coverage of meprobamate and other agents used in mental disturbances.

Cochairmen of the sessions are Dr. Frank M. Berger, medical director of Wallace Laboratories (New Brunswick, N.J.)—producers of meprobamate (Miltown)—and Dr. James Miller of the University of Michigan's Mental Health Research Institute.

Berger will also give the first of 23 technical papers on the quieting drugs. He'll describe differences in the latters' mode of action, classifying them either as "autonomic suppressants" (e.g., reserpine), which induce changes in feelings, mood and behavior, or as "central relaxants" (e.g., meprobamate), which produce little or no physical or mental changes.

Other papers will cover these studies:

- The effects of meprobamate and alcohol on driving and behavior in other activities.
- Clinical observation on 1,100 patients at the Orlando (Fla.) Air Force Base Hospital to evaluate meprobamate's therapeutic effectiveness.
- Meprobamate in chronic psychiatric patients.



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At left is the well-known symbol of the Chemical Division of MERCK & CO., Inc. At right is the new symbol of Merck Sharp & Dohme, the pharmaceutical and biological division of MERCK & CO., Inc. The new trademark is also the symbol of the Merck Sharp & Dohme International Division of MERCK & CO., Inc.

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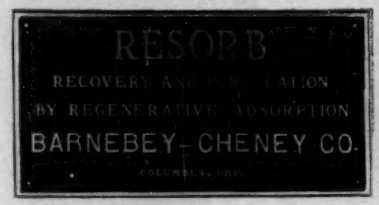

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BELL TEAM*: In solids, a 'wet' chemistry analogy.

Solid-State Challenge

To the trio of chemical researchers (*above*), one atom of a foreign metal among a 100 million atoms of germanium can represent a highly disturbing —but challenging—situation. That's because impurities of this order are important factors in semiconductor performance.

Employed at Bell Telephone Laboratories in Murray Hill, N.J. (where semiconductor research started), Howard Reiss, Calvin Fuller and Frank Morin are evolving a chemistry of the solid state that may eventually make control of semiconductor impurities a lot easier.

Thus far, they've found a parallel between solid-state chemistry and that of aqueous solutions. Implication: metals that now interfere with the functioning of transistors, etc., may be subject to "neutralization," obviating the need for their complete elimination.

Right now, there's no immediate prospect of this principle being applied commercially. Reiss, Fuller and Morin are concerned only with the fundamental aspects of the analogy they have found between chemical reactions in such solids as germanium and silicon and in liquid water.

Atoms on the Move: A single crystal of silicon containing impurities of boron and lithium illustrates the principles of the new chemistry. Boron is an electron acceptor in the system, but it cannot easily diffuse (move) at temperatures below the melting point of silicon. Lithium, on the other hand, is an electron donor and diffuses readily at temperatures where boron is immobile (300 C).

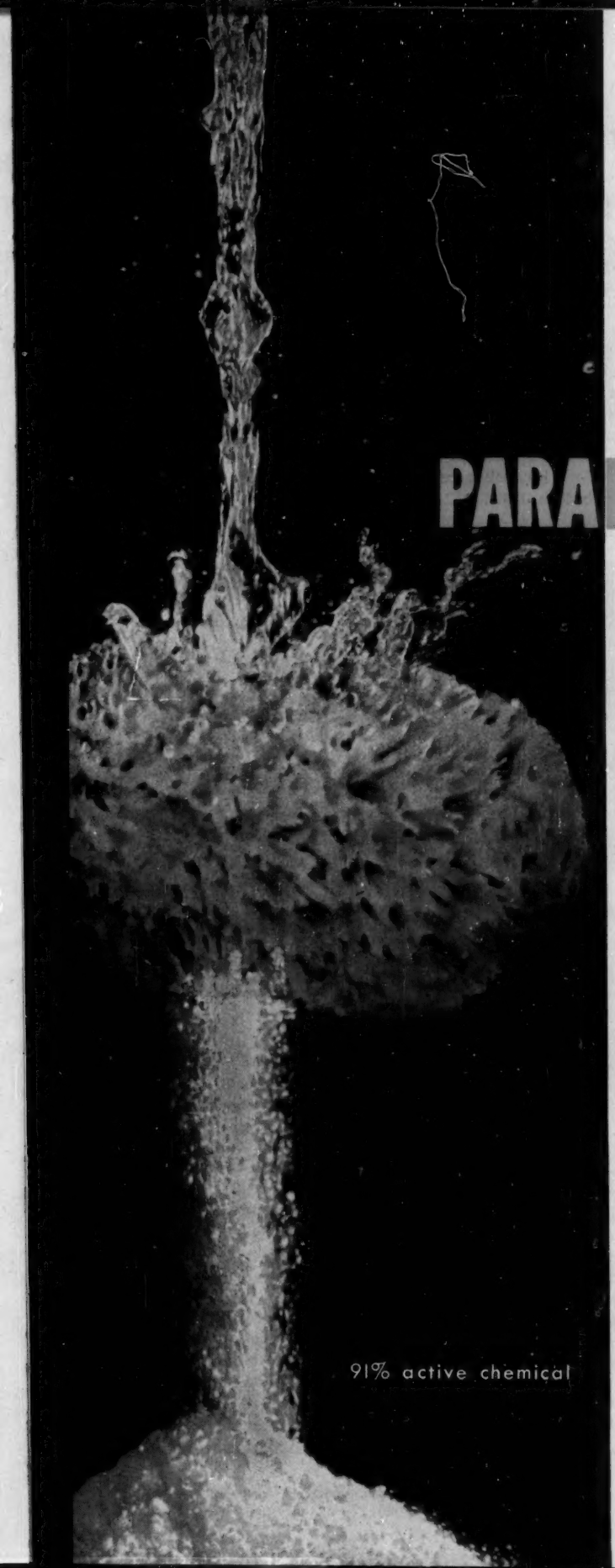
Dissolved lithium (in equilibrium with a source external to the crystal) ionizes in part to yield positive lithium ions and electrons, while boron yields negative ions and positive "holes." The "holes" are regarded as the solid-state analog of the hydrogen ion in aqueous solution, the electrons as the counterpart of hydroxyl ions.

By this reasoning, Lithium is a "chemical" base, boron is an acid.

Therefore, the lithium-boron reaction takes on the aspects of a classical neutralization reaction in which recombined "holes" and electrons correspond to water. This suggests that one impurity might be used to cancel out another.

Reiss and his co-workers have already applied their knowledge of such novel chemical equilibria to predict the solubilities of impurities in germanium and silicon. And they feel that there's also room for their new chemistry in testing the electrolyte theories of classical "wet" chemistry.

*Left to right: Morin, Fuller, Reiss examining a model of a germanium crystal.



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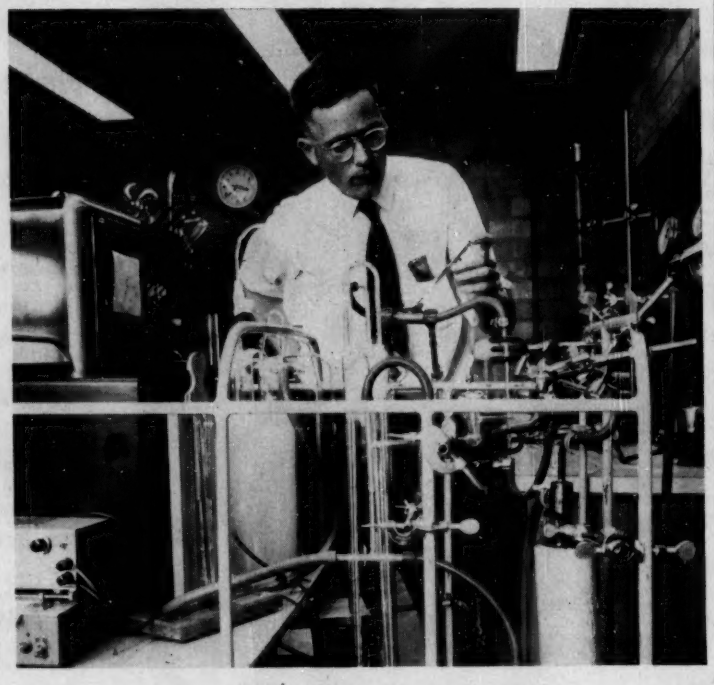
REPORTS

These new research reports are available from the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.:

- PB 121181 is a 102-page volume of Navy-sponsored lectures on the philosophy and practical use of statistics in research and design of experiments. Subjects include: An Example of Planning Laboratory Experiments; Usable but Not Widely Known Statistical Techniques; and Making Decisions from Experiments. Price: $2.75.
- Techniques and equipment used by the armed forces in nuclear research are described in PB 121124 and PB 121378. (Price: 50¢ each.)
- CTR-321 Rubber (10¢) and CTR-300 Adhesives (25¢) are new catalogs of government technical reports. The catalog on rubber lists 193 items in the OTS collection; the one on adhesives, 478 items. The reports are primarily the results of research done by the government or by private laboratories working under government contract for the Army, Navy, Air Force and other agencies; but they also include German technical papers captured in the World War II.
- Previously undisclosed data on the radiation-sterilization of foods is contained in 12 reports of research sponsored by the Quartermaster Food



Chromatography Under Pressure

DU PONT OF CANADA'S A. B. Callear (*above*), who built this vapor-phase chromatography unit at his firm's new $1.5-million Kingston, Ont., research center, believes the apparatus to be unsurpassed in its operating pressures and separation efficiency. While Callear won't disclose his performance figures, it's no secret that makers of similar commercial instruments are researching pressures above three atmospheres—about the highest now used. Reason: higher operating pressures (e.g., up to 150 psi) are expected to result in better separation of organic vapors and gases. Higher temperatures heretofore were thought to be the key to better separations.

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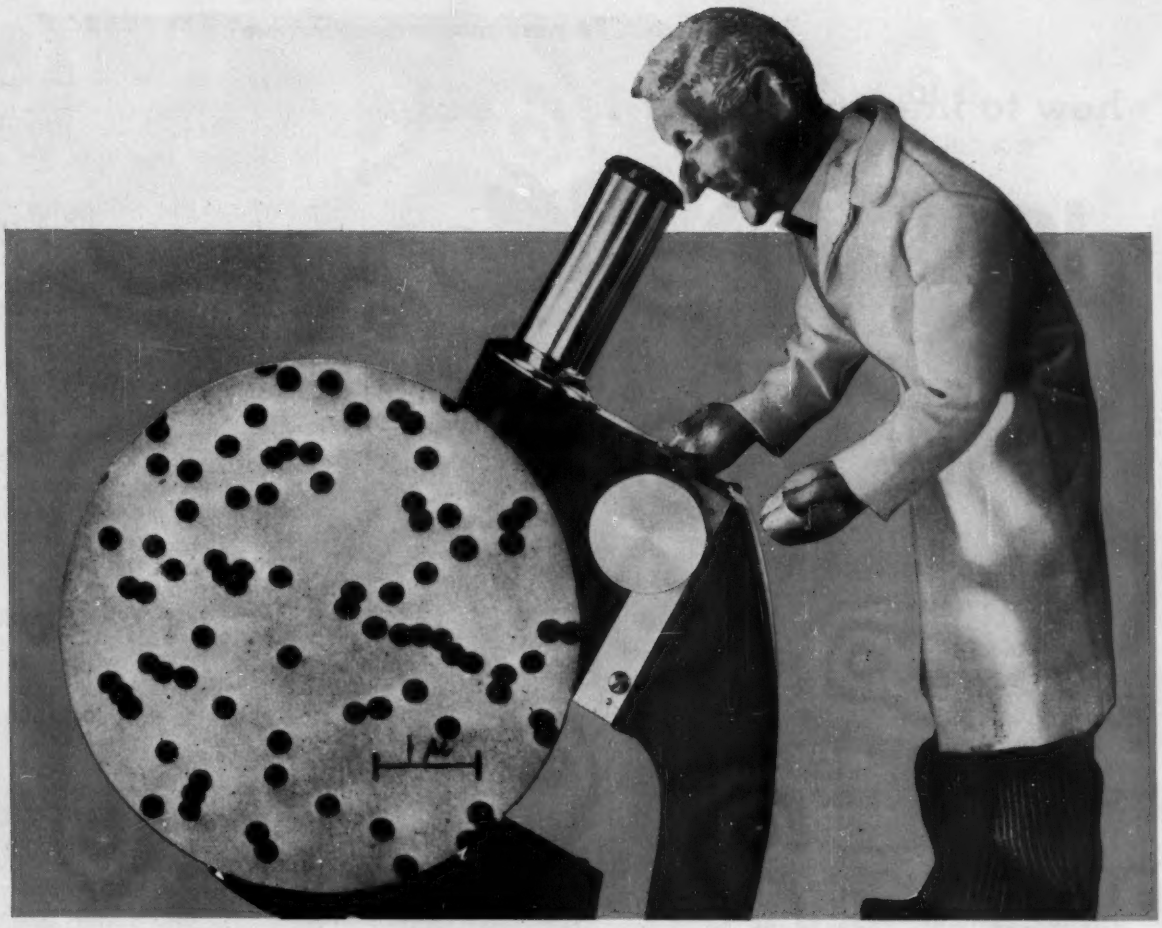

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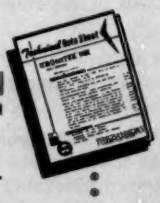

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and Container Institute. The collection (PB 121300 through 121310 and PB 121313) may be purchased for $13.75; individual prices range from 50¢ to $2.75.

• Testing of Silicone Rubber at Elevated Temperatures (PB 121192) covers results of tensile-strength, elongation and tear-strength tests on 15 commercial silicone rubbers at room temperature, 212 F and 400 F. Price: $1.25.

• Room Temperature-Vulcanizing Silicone Adhesive—PB 121209 ($1.75)—describes research in bonding silicone rubber to itself and to aircraft metals, without heat or pressure. Also included is a literature survey of silicone adhesives and room-temperature curing systems.

• Development of molybdenum disilicide as a protective coating for graphite in uncooled rocket motors is covered in PB 121084 ($1). The coating process comprises application of molybdenum disilicide powder suspended in a phenolic-resin vehicle on the graphite surface, curing, then heating in a neutral or reducing atmosphere to a temperature of 3900-4000 F. Result: a dense, adherent, glazelike surface that significantly protects graphite nozzles in a high-velocity stream of hot oxidizing gases. Upper temperature-limit of the coating under oxidizing conditions is 3500 F.

• Two hundred and five reports of research conducted under the Air Force's materials research and development program from July 1, 1954, to June 30, 1955, are abstracted in PB 111648S. Price: $3.50.

• Four new reports on titanium research conducted for the Air Force are PB 121267, The Cold Extrusion of Titanium ($1.25); PB 121213, A Study of Factors Affecting the Uniform Elongation of Titanium and Titanium Alloys ($1); PB 121069, Evaluation of High-Strength Weldable Titanium-Base Alloys ($1.75); PB 121219, Scaling of Titanium and Titanium Alloys ($2.75).

• Studies of the thixotropy of greases, micro test methods for lubricants, and the plastic properties of soap solutions are described in PB 121281 ($1), PB 121355 (50¢) and PB 111796 (75¢), respectively.

• A resin coating, resistant to white fuming nitric acid (WFNA) encountered by metals in jet aircraft, is the subject of PB 121205 ($1.25). The

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RESEARCH

report describes modification of polychlorotrifluoroethylene (Kel-F) through copolymerization with vinylidene fluoride; product is M. W. Kellogg's X-200 resin, which the report calls a suitable "lacquer" having superior WFNA resistance.

•

Government Guide: The National Science Foundation has published a guide to the complex of scientific activities of the 38 federal departments and agencies. Price: $1:75. It's available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

PRODUCTS

Dye Find: Thiahexacarbocyanine, a new dye synthesized by Eastman Kodak researcher Donald Heseltine, may prove useful in making more-sensitive photographic emulsions. Its absorption maximum, the wave length at which the dye absorbs the highest percentage of incident radiation falling upon it, is at 1,140 millimicrons. That is believed to be the furthest point in the infrared ever reached by a dye.

•

Ash-Free Alkali: A low-ash methanolic solution of tetramethylammonium hydroxide is now available in carboy and drum quantities from Southwestern Analytical Chemicals (Austin, Tex.). Highly alkaline, it leaves less than 0.1% ash when destroyed by heat, is potentially useful as an alkaline catalyst.

•

Ion Exchangers: Rohm & Haas (Philadelphia) is introducing a series of ion-exchange resins specifically for chromatographic analyses. Named the CG series, the resins are chemically identical with the firm's Amberlite materials, but feature optimum particle size for chromatography. Fisher Scientific fills orders up to 25 lbs.

PROJECTS

High Pressures: Development of instruments and standards that will permit more accurate measurement of pressures up to 200,000 psi. and higher is under way at the National Bureau of Standards. E. C. Lloyd is directing the work, which is partly supported by the Army Ordnance Corps' Watertown Arsenal and by the Interior Ballistics Laboratory at Aberdeen Proving Ground.

DOW

American progress has taken a long stride forward since the days of the full-length skirt and the open-air trolley. Just a few years after this photo was taken, Dow had begun manufacturing phenol for American industry.

DOW *and* PHENOL *have come a long way together*

Way back in 1915, our young chemical industry was trying to stand on its own feet for the first time. Phenol, a basic chemical, was needed in unprecedented quantities. That year, The Dow Chemical Company started work on a new process for the production of phenol, using benzene and salt as basic raw materials.

Thus began the long history of progress that makes available adequate supplies of phenol for industries around the world. Dow progress in process development, research and customer service all help modern companies make the best use of phenol in their products. In these ways Dow continues to answer the growing demand for high-quality phenol and high-quality service.

A booklet on the properties, uses and handling of phenol is available on request. Write THE DOW CHEMICAL COMPANY, Dept.OC 842B-1,Midland, Michigan.

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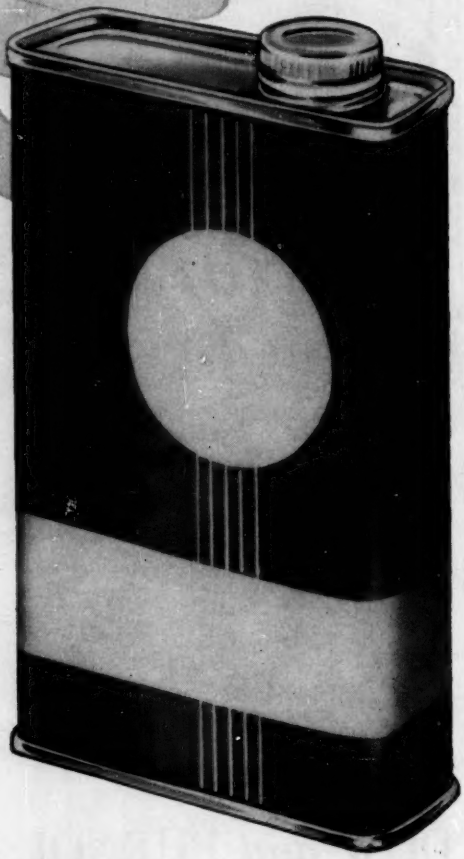

Your package has to "speak up" for sales, or it doesn't stand a chance in today's fast competition. That's why Continental's "F" style cans are the choice of so many manufacturers of waxes, polishes and other petroleum products. For, in addition to sturdy, easy-to-use construction, these containers offer you color and brilliance that only Continental master lithographers can achieve.

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Technology
Newsletter

CHEMICAL WEEK
October 13, 1956

Drug researchers will get together in Washington next week for their annual look at progress—and some current problems—in the development and use of antibiotics. Experts from the U.S. and nine other countries will serve up a total of 156 papers at the "Fourth Annual Symposium on Antibiotics."

Some of the things they'll be talking about:

• A batch of new antibiotics. Among the candidates for commercial exploitation: oleandomycin (a Pfizer product recently certified by FDA); Abbott's ristocetin; Lederle's nucleocidin and alazopeptin; Lilly's hygromycin and vancomycin: Squibb's amphotericin and xanthocillin (from the labs of West Germany's Chemie Grunenthal). Some of these have already proved effective against organisms that are resistant to the older antibiotics. Discussion will be angled toward two or more antibiotics in combination as a promising route to conquering resistant bacteria.

• Use of antibiotics to preserve food. One all-day session will be devoted to this subject.

• Intestinal antisepsis and the problems involved in sterilization before abdominal operations.

•

How much research does the chemical industry do on synthetic organics? The Tariff Commission reported last week that the chemical industry spent at least $264 million in that category in 1955.

Sales of synthetic organic chemicals are reported at $5.6 billion. That means that the industry was pumping about 5¢ out of every sales dollar back into research.

•

A sharp profile of research employment should be available shortly when the National Science Foundation publishes results of its 1954 canvass of the nation's scientists. Approximately 95,000 of an estimated national total of 250,000 answered questions on the type of work they were doing, who employs them, their age and job function.

Even before the first report is out, NSF is starting on a second poll. It's enlisting the aid of technical societies, hopes to get a larger percentage of scientists to respond. Congress ordered the foundation to draw up such a register for use in a national emergency.

•

The world's first large-scale atomic power station will start feeding electricity into Britain's national grid next week (Oct. 17) when Queen Elizabeth flips a switch. The station uses two graphite-moderated, carbon dioxide-cooled, natural uranium reactors. One has been critical for several weeks; the other is approaching the critical stage right now.

Technology

Newsletter

(Continued)

Anaconda will build a $1-million pilot plant to make alumina from domestic clays. The unit, to be located at Anaconda, Mont., won't be ready for another year.

It will treat 100,000 lbs. of clay/day from the company's open-pit mines at Moscow, Idaho.

Domestic alumina-bearing ores are plentiful in the U.S., but they are low-grade—20-40% alumina. Using them has been an economic rather than a technological problem. (The Bureau of Mines has done considerable work on this subject.) Anaconda won't say what approach it is taking other than that metallurgists have found what looks to be an economical route.

•

Leading virologists are viewing hopefully the announcement of a "successful oral vaccine for polio"—but their hope is tempered with caution. Albert Sabin, of the University of Cincinnati, last Saturday told a group from the Society of Experimental Biology and Medicine of the culmination of four years work in developing a live vaccine that could be taken orally and would offer long-term—possibly life—immunity against polio.

But Sabin's claims are based on extremely limited tests. And there are opposing schools of thought on live viruses. In theory, a live virus is fine. But production of live-virus vaccine can be tricky.

•

Nitrogen fixation by ionization radiation? Paul Harteck and Seymour Dondes of Rensselaer Polytechnic Institute report (in *Nucleonics*) that they've been able to do it.

They exposed quartz vessels of air to the ionizing radiation from powdered uranium 235 oxide. Optimum conditions, they found, were at an air temperature of 417 F and pressure of 25 atmospheres. Under these conditions, it would require 235 grams of the uranium to make 258 tons of nitrogen dioxide, enough to make 610 tons of nitric acid.

As they see it, raw material costs (for uranium) would amount to $5,875. The product (as nitric acid) would sell for $76,000. There are, of course, a great many other factors that would have to be ascertained before even a rough estimate of the economics of the idea could be obtained.

•

Synthetic "natural" rubbers are living up to their early promise, according to results reported by rubber companies on tests carried out by Army Ordnance. B. F. Goodrich's William Richardson reveals that Ameripol SN, the synthetic duplicate of natural rubber developed by Goodrich-Gulf, is indicated to be superior to natural rubber in military truck tires.

Firestone had previously reported similar results from Ordnance tests on its Coral rubber.

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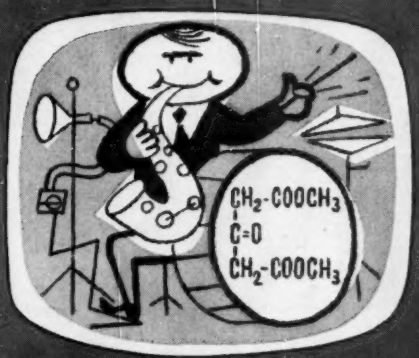

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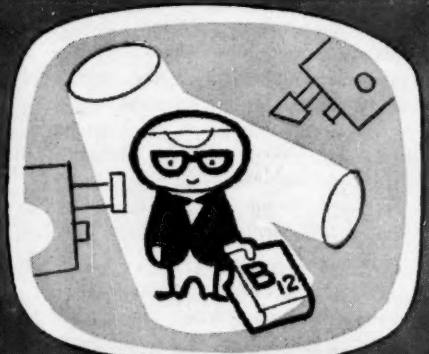

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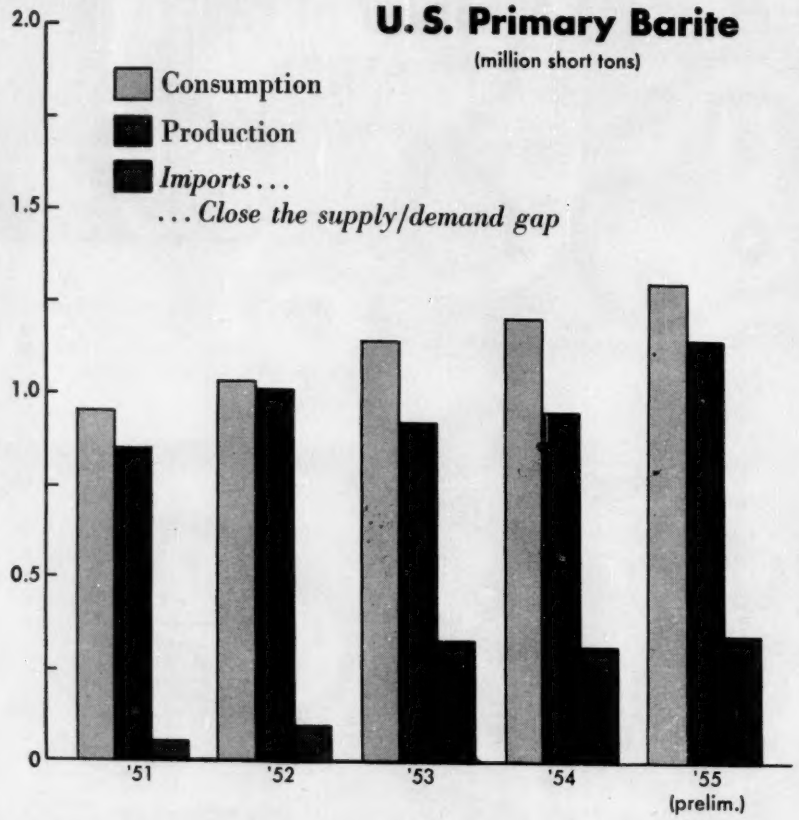


Barite: Climbing to a Crisis?

U.S. barite consumption is growing in leaps and bounds—so fast, in fact, that some marketers fear that the nation will soon face depletion of barite reserves.

In just five years, demand for barite in this country has jumped 65%—from about 786,000 tons in 1950 to 1.3 million tons in '55. It may hit 1.75 millon tons/year by 1960.

Mud Market: The biggest push has come from the soaring need for oil-well drilling muds—by far the largest outlet for barite. In 1950, for example, 483,500 tons (over 60% of all barite consumed in this country) went into drilling muds; by 1955, consumption for this purpose had risen to 1,137,000 tons—an increase of 235%.

Because of its size, demand for drilling muds will largely determine the future barite supply/demand situation. And it will indirectly—but significantly—affect the barium chemicals market. The oil industry itself, however, does not appear to be in for much trouble, because it can meet its own needs in several ways.

Barite drilling muds, for example, could be pumped out of old wells, and could easily be purified for re-use; such a practice—on a large scale—would obviously do much to conserve barite reserves.

Most oil companies, however, seem little inclined to bother about recovery of drilling muds, will likely resort to this practice only if barite supplies begin to dwindle, or if barite prices—for this or some other reason—climb high enough to make recovery financially more attractive than it is now.

In any event, it's unlikely that oil producers will have to worry about a barite pinch for some time to come, because imported material is becoming more readily available. Magnet Cove Barium—one major U.S. barite producer—already supplements its domestic output with sizable imports from its own mines in Nova Scotia. Baroid (Division of National Lead) has acquired barite operations on an island off the coast of Brazil. Both producers also buy barite from Mexico, can readily ship it to oil producing areas in the U.S.

Even if a serious shortage of domestic barite develops, and in the unlikely event that foreign supplies are cut off or become too expensive, oil producers can readily turn to alternate —though in some ways less desirable —materials for use in drilling muds.

Galena could be used in place of barite, but it's expensive and dirty to handle; iron ore (hematite) is inexpensive, but isn't popular because it, too, is messy to use. Other substitutes for barite in drilling muds may yet be developed; some barite producers already hint of such materials but cannot—or will not—specify their identity or when they might come into use.

Clearly, petroleum and natural gas producers can switch to other types of drilling muds if the need arises, but it's just as clear that barium chemical makers must stick to barium ores. Hence the oil industry's insatiable demand for barite may ultimately create more problems for other barite users than for itself.

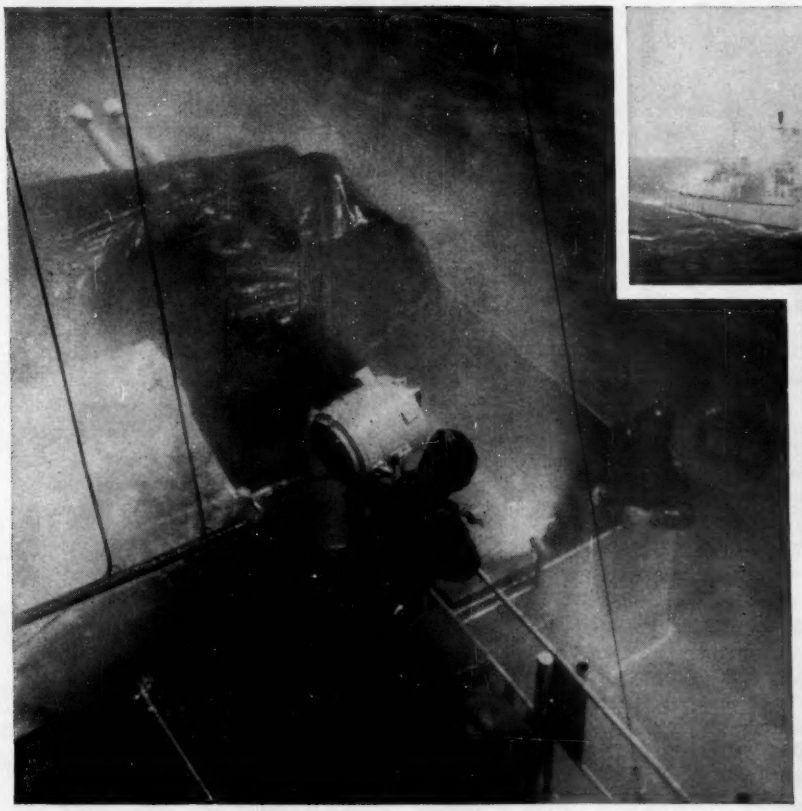
Road to Want? A newer cause for worry among barite users is the possible large-scale consumption of barite-rubber materials in road construction; this outlet, some observers think, may get a startling boost from the nation's new highway building program.

The material is made from barite and synthetic rubber by Rubarite (Tulsa), a firm owned jointly by Baroid Division of National Lead, Goodyear Tire & Rubber, and Bird and Sons (E. Walpole, Mass.).

Though the additive (for use in asphalt) has been around for several years, large-scale use has been hampered by the long period of time needed to test its properties. However, an official of Rubarite states that about 600 miles of road will be coated with Rubarite seal coat in '56, and adds, "We will probably make close to 1

Another new development using

B.F.Goodrich Chemical *raw materials*



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Now ships shower themselves

to wash away radioactive contamination

NUCLEAR explosions produce a deadly byproduct—radioactive fall-out. As a counter-measure, the Navy has devised a washdown system which enables a ship to spray itself with thousands of gallons of sea water, washing away contamination within minutes.

First, metal piping was tried for the system—but it added too much weight. The answer was found in rigid vinyl plastic pipe, made of Geon polyvinyl materials. This piping weighs but one-fourth as much as metal. It's impervious to sea water's corrosive effects, unaffected by either freezing or tropical temperatures. And, using simple but strong solvent-welded joints, it's so easy to install that the ship's crew can do the job easily. The washdown system was developed by the U. S. Navy's Bureau of Ships. The Grinnell Company, Inc. was the principal contractor in this effort.

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For more information write Dept. S-11, B. F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, O. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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U.S. BARITE END-USE BREAKDOWN

(*thousand short tons*)

	1950	1953	1955*
Well drilling	483.5	824.1	1,137.0
Chemicals	108.4	163.5	157.0
Lithopone	99.7	52.3	42.8
Glass	24.6	24.9	28.0
Paint	28.0	24.0	25.0
Rubber	19.0	21.0	25.0
Misc.	22.9	26.2	10.0

*Preliminary figures.

million lbs. of the additive this year—and this quantity does not include an additional 1.25 million lbs. of a similar material used on jet airfield runways."

The total theoretical road market for barite could be forecast on the basis of an expected need of 128 million tons of bitumen in road construction during the next 10-13 years, and on the basis that 3% by weight of the barite-rubber compound (75% barite, 25% rubber) is added to road asphalt. Such calculations would, however, have little practical significance.

More important to the problem of barite reserves is the fact that the additives are not made from primary barite, but from mill tailings, which in the past—before proper flotation methods were developed—had been discarded as waste.

Reserve Poser: Highway uses, though potentially large, do not now threaten the nation's supplies of primary barite, and how soon U.S. reserves are depleted will depend mainly on the oil industry's future demand for drilling muds.

How does the reserve situation look today? Barium deposits, in one form or another, exist in many areas of the U.S. But the center of the nation's barite mining is now at Magnet Cove, Ark., location of the Baroid and Magnet Cove Barium Corp. mines. A spokesman for one producer estimates that if production continues at the present rate, combined reserves of the two firms—in this area—will probably last only 10-15 years.

Mining operations at Magnet Cove have now reached a depth of some 700 ft.; at the 1,000-ft. level, the bed will be only about 20 ft. thick, and mining would become unprofitable (assuming present selling prices of barite).

This is especially significant because the Magnet Cove area contains one of the nation's few bedded deposits that are relatively easy and economical to mine and process. Other U.S. barium deposits either require different methods of processing, or are not yet worked because they are considered of marginal or submarginal value—i.e., transportation charges to consuming centers are too high as a result of location.

Though many observers are optimistic about long-range supplies (because barium ores other than barite exist in this country), it's generally conceded that better metallurgical methods must be devised for profitable recovery from these sources.*

Lithopone Lag: Virtually all markets for lithopone (paint, floor coverings, textiles, paper, etc.) have fallen off steadily during the past few years. Total consumption of lithopone in 1951 was a near 103,000 short tons; by '55, it had slumped by more than 58% to 42,800 tons. (The rubber market is the only sizable use that has shown some increases.)

The reason, of course, has been the increasingly heavy competition from titanium dioxide—and there's every indication that the newer pigment will continue to make further inroads into lithopone markets.

Use of barite in the manufacture of chemicals must be viewed over a long-range period because requirements for these purposes fluctuate with clocklike regularity from year to year. However, over the last five years, barite needs for chemical manufacture have risen about 45%—from 108,350 tons in 1950 to 157,000 tons in '55.

Most uses (other than oil drilling muds) have shown relatively modest increases during the last half-decade. Glass manufacture, for example, took 24,600 tons of barite in 1950, 28,000 in '55. Rubber needs increased from 19,000 tons to 25,000 tons during the same period. Paint requirements, on the other hand, dropped off to 25,000 tons last year from 28,000 five years ago.

Substantially increased use of barite

*The U.S. has large barite-fluorite deposits, which could be mined for both component minerals—provided improved methods of separation are found. Also, barium recovery from rare earths and from ores of lead, zinc and tin is possible, at least theoretically.

U.S. BARIUM CHEMICALS OUTPUT

(*thousand short tons*)

	1953	1954	1955*
Black ash	139.0	116.2	135.4
Carbonate (synthetic)	74.1	65.3	78.9
Chloride (100%)	14.8	12.2	14.6
Hydroxide	12.5	12.6	15.5
Oxide	14.6	15.2	16.5
Sulfate (synthetic)	14.4	10.5	10.7
Other	7.8	2.7	2.4

* Preliminary figures.

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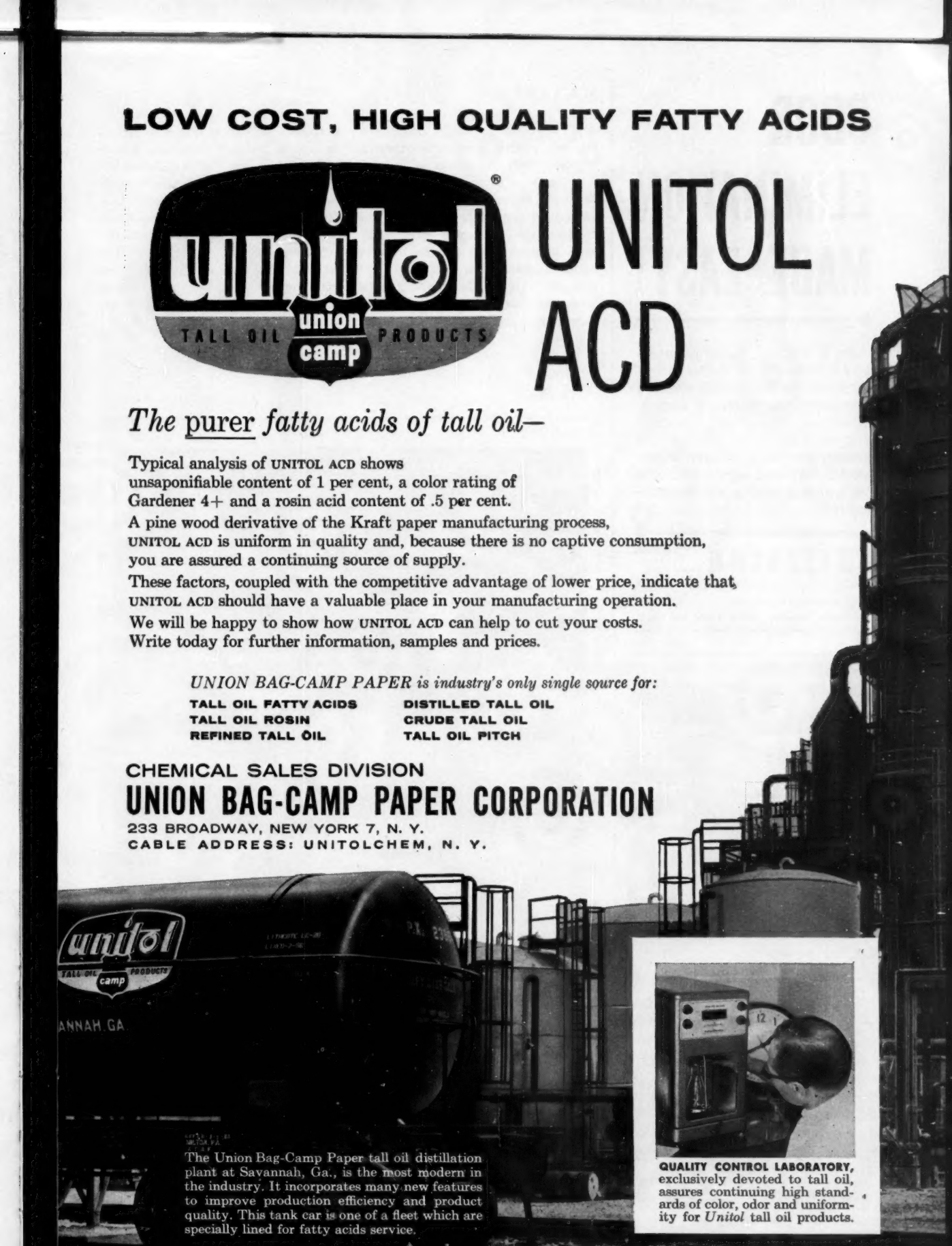

The Union Bag-Camp Paper tall oil distillation plant at Savannah, Ga., is the most modern in the industry. It incorporates many new features to improve production efficiency and product quality. This tank car is one of a fleet which are specially lined for fatty acids service.

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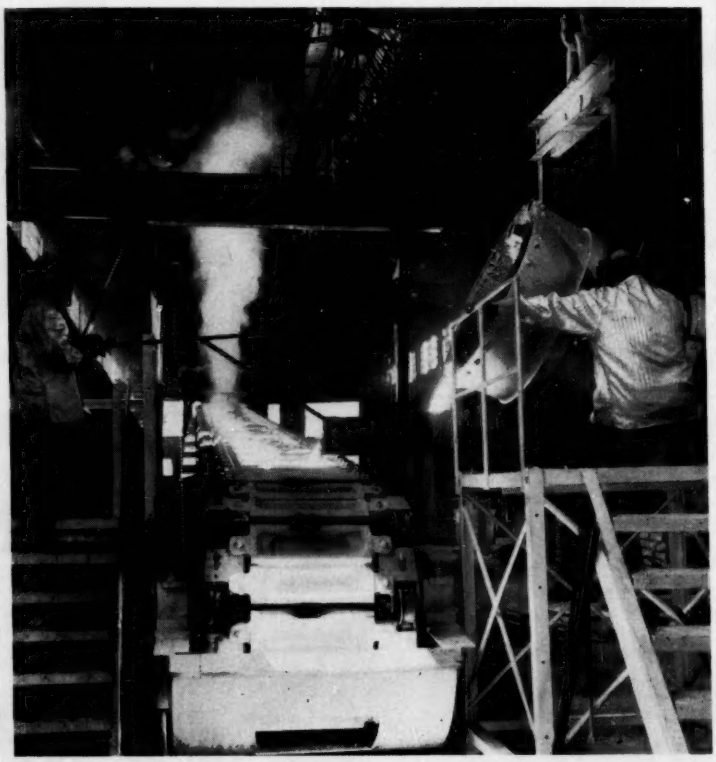
as an aggregate to weight underwater concrete structures has been expected, but how well this outlet is growing is difficult to determine because the Bureau of Mines no longer lists the use separately, instead lumps it with the "undistributed" category. This category slumped from 13,584 tons of barite consumed in '52 to 10,000 tons in '55; but the over-all trend gives no real indication of what's happening to the concrete aggregate outlet.

Total U.S. consumption of barite is climbing steadily; and right now, imports are bolstering domestic output enough to forestall immediate threats of a barite pinch. But this should not lead to complacency about the long-range picture; easily-worked U.S. deposits are tapering off, and many problems—both technological and economic — must be solved before secondary sources can be depended upon for adequate supplies. And the way it looks now, many of the answers will have to be found within the next two decades if imports are to remain gap-closers, and not become primary sources of barite.



More Pigs for the Market

NICKEL OUTPUT at National Lead's Crum Lynne, Pa., refinery is scheduled to reach full capacity before '57, will then meet—perhaps exceed—the 14-million-lbs./year rate called for in the company's contract with General Services Administration. All the raw material —nickel oxide sinter—is produced by the firm's subsidiary, Nickel Processing Corp., at a government-owned plant in Nicaro, Cuba.

The Nicaro facilities now produce nickel oxide powder and sinter at a record 31 million lbs./year, will be able to make about 75% more when a major expansion is completed in the near future.

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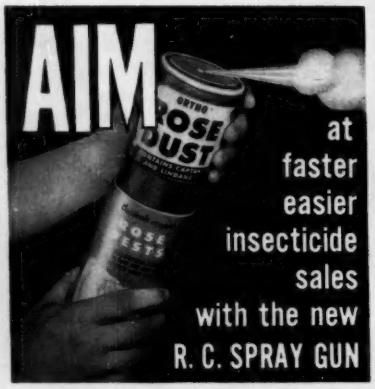

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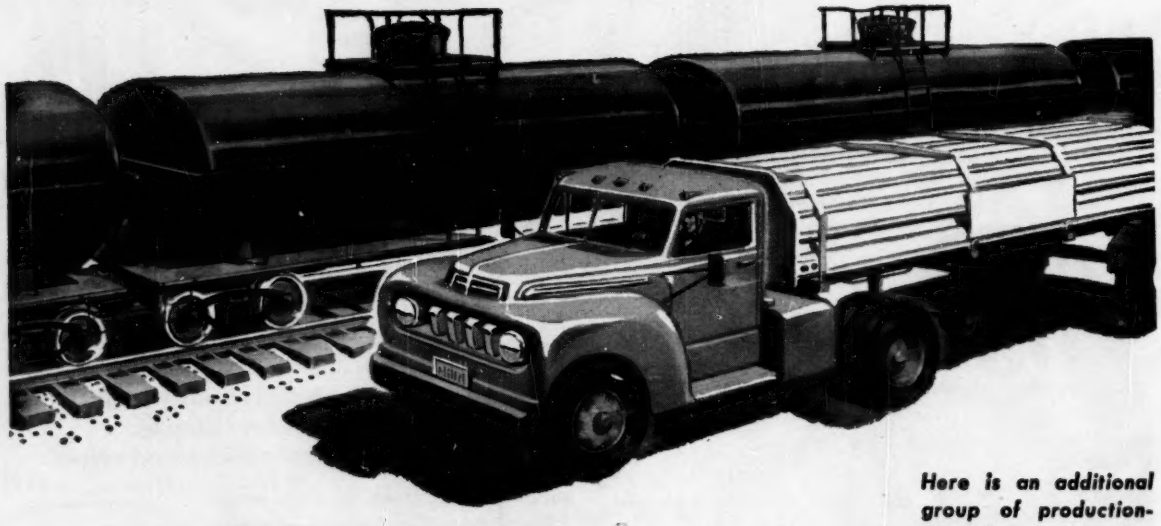

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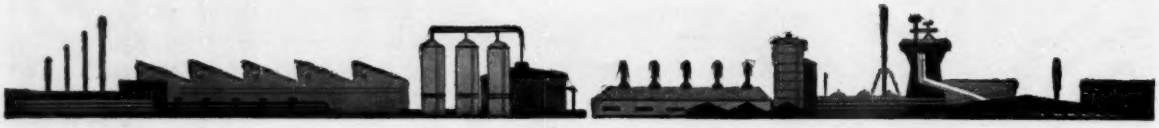

Market Newsletter

CHEMICAL WEEK
October 13, 1956

A billion-pound annual output of tall oil by '58? Could be, says the Tall Oil Division (formerly Tall Oil Assn.) of the Pulp Chemicals Assn. And bolstering its contention is the current and planned expansion of the sulfate pulp industry, source of the oil, that will hike capacity of unbleached sulfate pine pulp from last year's 25,000 tons/day to some 32,000 tons within the next two years.

The division's prediction, though unusually optimistic, compared with previous conservative estimates by many trade followers, falls in line with an earlier *CW* forecast (*CW, May 12, p. 104*) on the likely trend of tall-oil production and consumption.

•

Now it's official. This year will wind up as one of the best ever for chemical sales. A just-out Business & Defense Services Administration report, matching the sunnier aspects of the latest *CW* state-of-the-nation's-market survey (*CW, Sept. 29, p. 64*), indicates that chemical manufacturers' sales in the first half of '56 hit a new six-month peak of about $12.1 billion. Probable year-end total, says the Commerce Dept. agency: nearly $24 billion.

On rubber product sales, BDSA expects that third-quarter figures will be lower than second-quarter volume, although sales "may well improve" in the final three-month stretch. Total '56 sales, however, aren't likely to equal last year's record $5.5 billion.

•

Although price increases are getting most of the attention these days, a few items are slipping down the price scale—crude glycerine, for one. Trade reports have it that some soap lye business, pressured by the continued weakness in foreign material, is being transacted on the basis of 15¢/lb., a full 1¢/lb. under previous quotes. Saponification material, too, is lower at 16½¢, compared with last week's shade over 17½¢/lb.

Refined-glycerine tags, on the other hand, appear to have steadied after the recent buffeting by foreign crude offerings and an overstocked position. Inventories are still relatively high, of course, but material is moving out at a good clip, especially to the paint trade, which is now getting ready for the anticipated fall pickup in consumption.

•

Sodium nitrate consumers are getting a price break. Early last week Chilean fertilizer material prices were chopped $1.75/ton (on port prices), in the first downward move since '50. Imports of the natural nitrate are running almost two-to-one over domestic output of synthetic sodium nitrate (600,000 tons/year vs. about 350,000 tons), and the former has set the price pace for the trade at certain locations.

Current port quotes on the Chilean nitrate: $46/ton in bulk; $49.50/ton, 100-lb. paper bags.

Domestic producers, in this instance, didn't follow the Chilean lead immediately, but chances are that their schedules will be competitive in the next few days.

Speaking of competition, the flood of low-cost foreign benzol into the U.S., which by the end of the year could total some 60 million gal., hasn't hurt the domestic market as much as some had feared. Too, an earlier concern that the buildup of inventories at the consumer level before the recent steel strike would slow down trade in the aromatic, has proved groundless. Benzol supply/demand is remarkably in balance, and most marketers expect it to remain so, at least for the next three or four months.

Although the imported benzol is selling at considerably under current 36¢/gal. domestic tank schedules, bulk of the material (chiefly from Poland and Czechoslovakia) is funneling into a narrow styrene channel, not affecting more general industrial outlets. Demand from the latter, particularly for synthetic phenol and dye intermediates, is brisk enough to absorb increasing output from U.S. coke ovens.

Toluol outlook, despite a whittling of the high stocks producers were carrying, is just about as dull as it was during the summer (*CW Market Newsletter, Aug. 18*). There's been little if any improvement in basic demand and today's higher coke-oven production won't help matters.

Adding sweeps of gray to the over-all toluol picture is the continuing loss of European markets, a once-important, handy outlet for excess U.S. material. Bargain-priced toluol, bearing Russian satellite labels, has just about elbowed U.S. sellers out of the running.

There's some question, though, whether the current toluol situation will soon engender any general price-altering. Occasionally, reports of soft pricing areas pop up, but these are hard to pin down.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending Oct. 8, 1956

	Change	New Price
UP		
Candelilla wax, refd., spot	$0.02	$0.75
2-mercaptobenzothiazole, bgs., fibr. drms., wks., frt. alld., ton lots	0.02	0.42
Mercaptobenzolthiazyl disulfide, bgs., fibr. drms., wks., frt. alld., ton lots	0.02	0.52
Picric acid, NF, bbls.	0.25	0.85
DOWN		
Crude glycerine, soap lye, 80%, tks.	0.01	0.15
Crude glycerine, saponification, 88%, to refineries, tks.	0.011	0.165
Sodium nitrate, imp., bulk c.l., ports, ton	1.75	46.00
Sodium nitrate, imp., 100-lb. bgs.	1.75	49.50

All prices per pound unless quantity is stated.

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Nopco Defoamers

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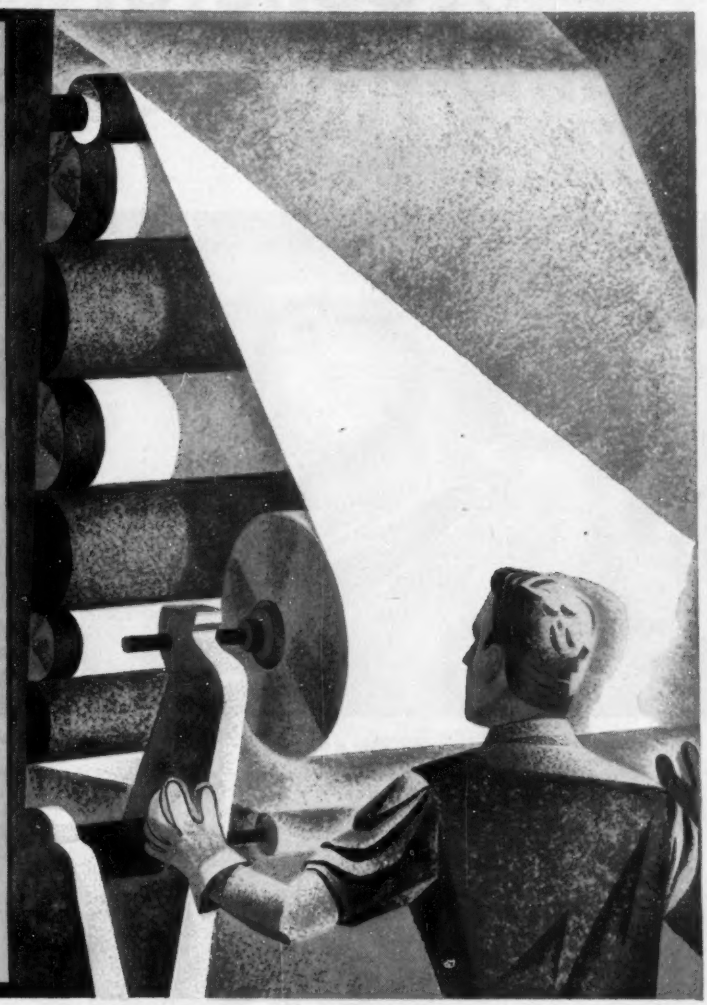

In paper manufacture, production can be greatly slowed down by "foam" —the tiny air bubbles that cause imperfections in the finished sheet, as well as "wet breaks" that force costly shut-downs during operation, and a host of other evils. Today Nopco surface active agents minimize foam, and allow the machines to run near their top speed and still produce a more uniform sheet of quality paper. Nopco, in fact, was the first to make a specialized defoamer for use in the paper industry.

It's not only in paper, of course, that Nopco chemists have set themselves the task of creating products to fill definite needs. Other Nopco processing chemicals give nylon yarns a soil-resistant finish... reduce curing time for fertilizers... help make greases that lubricate better at low temperatures... to mention just a few.

Why not let these practical chemists have a try at *your* most urgent current production problem? Just write the Technical Service Department of Nopco Chemical Company, Harrison, N. J.

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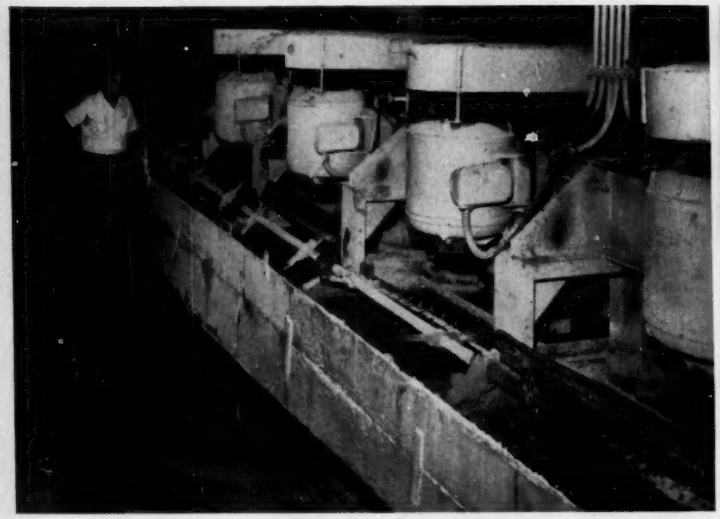
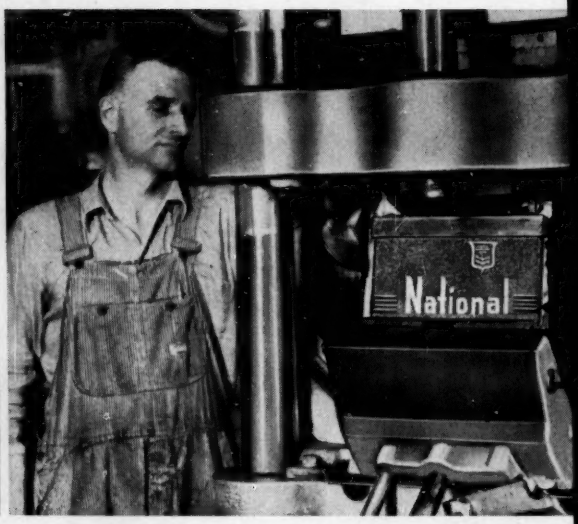
General Mills expands compounds to



ORE FLOTATION

Alamines and *Alamacs*, cationic flotation reagents, are widely used to recover non-metallic ores, such as phosphate, feldspar, mica, potash. They function by *selective absorption*, provide a hydrophobic film which gives affinity for air bubbles. Concentration is made by flotation of desired ore or of impurities.

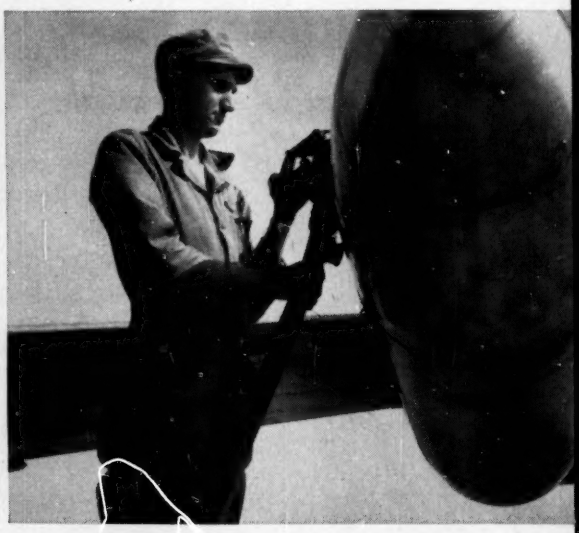


HARD RUBBER COMPOUNDING

Alamines 46 (mixed amines) and *H26* (primary hydrogenated tallow amine) are outstanding mold release agents. In curing hard rubber articles, such as this battery box, the amines reduce *permeability* and activate *cure* when used at levels of only 0.4-1.0 per cent

TEXTILE CHEMICALS AND SOFTENERS

Aliquats and *Alamacs*, cationic softeners, are used in textile chemicals for home and industry. Small quantities of these conditioners give fabrics a luxurious, silky softness not otherwise achieved. Make excellent *anti-static anti-lint agents* and germicides too.



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Alamines and *Diams* prevent formation of sludge precursors, add stability and corrosion inhibiting qualities to petroleum products. Completely ashless, the amines, have widespread use in jet airplane fuel, fuel oil, diesel fuel.

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its line of fatty nitrogen serve industry still better

Buyers of industrial chemicals know that General Mills compounds are of the same high quality order after order. It's this uniformity, and promptness of delivery, that has earned for us a long list of distinguished customers. In order to serve these customers still better, we now offer new and improved fatty nitrogen products. With expanded facilities for producing fatty nitrogens, we can handle immediate and future needs of industry in tank car quantities. We invite your initial order, and think you'll agree with our present customers that General Mills is a *dependable* source of fatty nitrogen products.

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General Mills fatty nitrogen compounds are derived from a variety of types of fatty acids of which General Mills is a basic manufacturer. The fatty nitrogen compounds have excellent film forming properties due to their strong cationic surface activity, and lend themselves to many applications other than those illustrated.

ALAMINES
General Mills Primary and Secondary Fatty Amines

		SPECIFICATIONS		
PRODUCT	DESCRIPTION	Primary Amine Content (%)	Amine Number*	Iodine Value
Alamine 21	Primary coco amine	87 min.	250 min.	12 max.
Alamine 21D	Distilled primary coco amine	97 min.	272 min.	12 max.
Alamine 26	Primary tallow amine	87 min.	192 min.	35 min.
Alamine 26D	Distilled primary tallow amine	97 min.	207 min.	35 min.
Alamine H26	Primary hydrogenated tallow amine	87 min.	192 min.	6 max.
Alamine H26D	Distilled primary hydrogenated tallow amine	97 min.	207 min.	6 max.
Alamine 7	Primary stearylamine	87 min.	186 min.	6 max.
Alamine 7D	Distilled primary stearylamine	97 min.	202 min.	6 max.
Alamine 46	Mixed amines	60 min. Secondary Amine Content (%)	150 min.	20 min.
Alamine 221	Secondary coco amine	85 min.	—	12 max.
Alamine H226	Secondary hydrogenated tallow amine	85 min.	—	10 max.

*mg KOH equivalent to 1 gram of amine

ALAMACS
General Mills Primary Fatty Amine Acetates

PRODUCT	DESCRIPTION	Amine Value	Percent Neutralization	Iodine Value
Alamac 21	Primary coco amine acetate	191 min.	97-103	10 max.
Alamac 26	Primary tallow amine acetate	154 min.	97-103	28 min.
Alamac 26D	Distilled primary tallow amine acetate	164 min.	97-103	28 min.
Alamac H26	Primary hydrogenated tallow amine acetate	152 min.	97-103	5 max.
Alamac H26D	Distilled primary hydrogenated tallow amine acetate	162 min.	97-103	5 max.
Alamac 7D	Distilled primary stearylamine acetate	159 min.	97-103	5 max.

ALIQUATS
General Mills Fatty Quaternaries

		SPECIFICATIONS		
PRODUCT	DESCRIPTION	Percent Quaternary Ammonia Compound	Percent Sodium Chloride	pH
Aliquat 26	Monotallow trimethyl ammonium chloride	48-52	1.0 max.	9 max.
Aliquat 221	Dicoco dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat H226	Dihydrogenated tallow dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat 400	1:1 mixture Aliquats 26 and 221	48-52	1.0 max.	9 max.

DIAMS
General Mills Fatty Trimethylene Diamines

PRODUCT	DESCRIPTION	Amine Number	Water Content	Melting Range
Diam 21	N-coco trimethylene diamine	375 min.	2% max.	20-25°C.
Diam 26	N-tallow trimethylene diamine	285 min.	2% max.	43-47°C.

GET MORE FACTS!

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Write Dept. CW 101

CHEMICAL DIVISION
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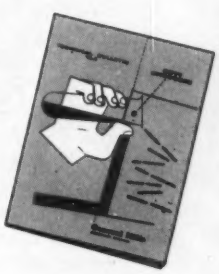

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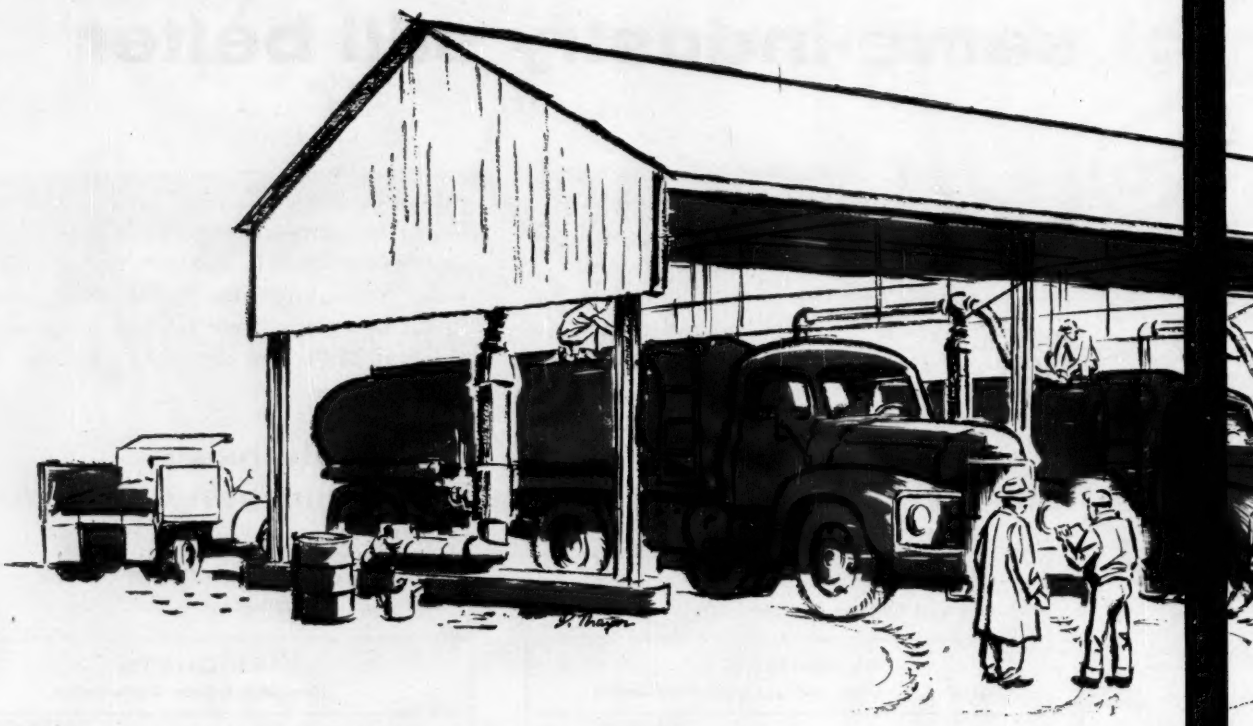

COMPANY-OWNED TANK-TRUCK FLEET: Chemical industry's traffic managers are unenthused about prospect of

Tank-Truck Hauling Dilemma Private

"We hope that it will not be necessary for us to get into the trucking business in order to meet competition." That was the veiled warning Victor Chemical's Director of Traffic Walter Saaby tossed out at a recent meeting of the National Tank Truck Carriers Assn. in East Lansing, Mich. (CW, Sept. 15, p. 90.) The obvious question in many haulers' minds is this: Are any chemical companies actually planning such a move?

To find the answer, *CW* last week spot-checked the industry, came up with this conclusion: if there is a trend to private carriage by tank truck, it's confined to the smaller companies and distributors. Big chemical producers are almost unanimous in their aversion to the idea. One spokesman puts it this way: "Private haulage is a good way to provide service—and lose money."

Here's what others are saying:

J. H. Wilharm, traffic manager, Diamond Alkali: "It greatly depends on the nature of products and business as to whether a company will operate its own truck fleet. Diamond finds it necessary, and to its best advantage, to use both common carriers and operate its own fleet. For seasonal products (e.g., insecticides) and other shelf goods going to ultimate consumers, Diamond has to operate its own trucks in order to meet service requirements. With this type of product, the company is hauling various sizes of loads and finds it economical to use its own trucks.

For regular large-quantity shipments, on the other hand, the common or contract carrier is best. Said Wilharm, "You can't just call a common carrier today and be assured that special orders and seasonal shipments will be delivered immediately. Furthermore, if your load is not big enough, you will find it more profitable to send it by your own truck, and get faster delivery, too. The nature of the shelf-goods part of our business requires that we be able to make fast delivery."

Traffic Manager John T. O'Leary of Harshaw Chemical states: "We do everything possible to avoid using our own motor carrier equipment." He looks at it this way: when a company owns and operates equipment, every salesman becomes a dispatcher in the organization and every customer is a good customer who needs delivery immediately, if not four hours ago. Also, maintains O'Leary, by using a common carrier, worries about maintenance, breakdowns, union regulations, etc., all become someone else's problem.

Not in favor of private carriage but envisioning the possible need for chemical companies to do so to meet competition from distributor-owned fleets is Walter Morgan, Carbide and Carbon's assistant traffic manager. Morgan thinks distributors don't realize what this service is costing them—yet.

On this point, distributor-owned fleets, Van Waters and Rogers, largest

ownership and operation.

vs. For-Hire

chemical distributor west of the Rockies, points out that it serves many small and widely separated moderate-size companies. It can't reach many of these customers by rail, at least not economically, because shipments often require a truck haul from the rail point.

Furthermore, commercial truck carriers would be unwilling (i.e., economically unable) to provide the necessary service—deliveries to any one location often being infrequent and of broken sizes. Nor do commercial carriers always have the necessary ICC authority to haul from VW&R warehouses to customer plants. When a customer calls for a delivery "now," truckers usually have trouble obtaining emergency authority from ICC quick enough to suit VW&R.

Also serving Western markets is Oronite Chemical Co. Unlike VW&R, Oronite has absolutely no interest in getting into tank-truck operations. Oronite President Jerry Hughes thinks chemical companies should look closely before they leap into private hauling. He feels that maintenance, repair crews, scheduling, reliefs for union drivers, investment of capital, management talent, etc., add up to no savings for the company.

For one thing, company employees tend to treat company trucks somewhat rougher than they treat their own family cars, he believes. Also, he warns, without the know-how accumulated by a commercial trucking operator, all sorts of hidden costs can sink the unwary.

Pacific Intermountain Express, an increasingly important factor in Western chemical hauling, says that most of the private carriage operators go into this activity because they need special service or special equipment that the common carriers cannot supply. Based on an off-hand estimate, PIE believes, the percentage of all chemicals shipped by private haulage is dropping steadily and significantly. Asked about rates, PIE replied that truck rates are not going up in the West, are lower now than they were five years ago, on the average, for bulk chemicals in tank-truck loads. Though railroads received a blanket increase recently, the truckers did not . . . and there is no immediate increase in sight.

On this latter point, there seems to be general agreement that while package-goods haulers usually follow the rails in upping rates, this usually isn't the case with tank truckers. One reason: while package-goods haulers are members of groups such as Central States Motor Freight Bureau, which allows them to set rates in consort, the tank-truckers are not. According to one traffic manager: "It's apparently a case of where there's unity there's strength."

Werner F. Shoenthaler, manager of distribution for Shell Chemical told *CW*, "If we can avoid private carriage, we avoid it. We're not in the trucking business. Also, when it's possible to get contact carriers, we do." Why? Possible lower rates; most carriers are willing to provide special equipment when needed.

Shell operates a few trucks in Los Angeles at present, keeps them busy most of the time. Schoenthaler admits that they can't do the job as cheaply as a carrier could, but says this firm has to do it to provide the service. A point to consider, in Schoenthaler's opinion, is the question of labor. All Shell drivers are entitled to full employee benefits, and this must be added to the cost of operation.

American Cyanamid has some tank trucks of its own. Oscar Swiedler, assistant traffic manager, avers that it's possible to maintain these trucks economically because of the constant use that's made of them. For instance, the firm's two trucks in Kalamazoo are kept on the go in supplying liquid alum to the many paper producers in the area. Says Swiedler, "If you want to buy a truck, you should be able to write it off in two years." His theory: you have a choice —write-off in two years without maintenance, or write-off in five years with maintenance.

Big failing of carriers at present, Swiedler thinks, is their inability to figure costs accurately. He thinks that most truckers who know how to figure costs can "do business profitably at a figure close to your figure."

This same point was brought up by J. Warren Sullivan, head of traffic at Allied. In his opinion, truck rates are too seldom based on cost. A company must have its own calculations to "wave under the carrier companies' noses, or you're sunk." Without them, the truckers try to use rail rates as the yardstick, he charges.

Pittsburgh Coke & Chemical says it doesn't own trucks, never has, and is not contemplating any such move. Says W. D. Gordon, traffic manager, "Tank-truck carriers are doing a marvelous job in keeping up with developments in the chemical industry."

John Swingenstein, traffic manager of Neville Chemical Co., told *CW* that his firm's petroleum division owns two or three tank trucks, but none is used for hauling chemicals.

In a survey made a year ago, Neville scotched the idea of company-owned trucks, reasoned that too much idle time made them uneconomical.

At nearby Koppers Co., James F. Haley, vice-president and manager of the traffic and transportation department, reports that he uses only common carriers and a few contract carriers. The firm owns a few old

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By John J. Cooke, Secretary

Sworn to and subscribed before me this 14th day of September, 1956.
[Seal] JANET A. HARTWICK
(My commission expires March 30, 1957.)

tank trucks, which are used strictly for in-plant service, but he does not advise ownership of truck fleets. At the present level of carrier rates and with excellent service it's receiving, Koppers wouldn't consider ownership.

Koppers currently hires trucks mostly for short hauls, gives the railroads preference for its business except where the railroads can't do the job.

Du Pont has few company-owned trucks, finds that service by outside carriers is good. Except for special circumstances, reports Robert W. Marshall, director of the traffic department, Du Pont will not go into the trucking business either by tank or otherwise.

Reichhold Chemicals Inc. has found it economical to operate its own fleet of trucks on the West Coast. It ships formaldehyde south from Seattle to San Francisco, is able to utilize the trucks on the return trip by shipping carbolic acid from the bay area to Seattle. It's this back haul, admits Wayne P. Gunns, general traffic manager, that enables Reichhold to beat carrier rates. In general, though, he doesn't see why a company should use its own trucks when a contract hauler is available.

International Minerals reports that the only place it operates its own trucks—a fleet of six—is in the Carlsbad, N. M., area, in its muriatic acid business. The firm does it there simply because ownership is the most economical way to operate; attempts were made to have the railroads lower their rates, but without success. Although ownership provides better control of schedules, IMC would like to stay out of trucking if possible. In all other instances, e.g., hauling sulfuric acid in Florida, it uses the services of a common carrier.

Though Stepan Chemical has just acquired a truck for its new plant at Millsdale, Ill., primary reason for the move was government red tape, not economics. Most of the time, common carriers don't have permits to transport either from the plant site or to the customer.

It takes 2 to 3 weeks to get such authority, due to fighting by the railroads and other truck lines for the business. Stepan has had a man working almost full-time getting permits for truckers; but with its own truck, it can forget about it. Then too, Stepan can't always get the special equipment it needs from the common carrier when it's needed. A high price tag on this special equipment precludes common carriers having much on hand, thus what is available is in heavy demand.

Most traffic men agree, though, that carriers are doing a good job of providing special equipment. This situation may alter somewhat in the near future, however. Complaints that tight and costly credit are causing some carriers to postpone purchases of new equipment are increasingly being heard.

Leasing as an alternate to private or for-hire carriage was greeted lukewarmly by traffic managers. Big reason: the labor problem. Few chemical companies wax enthusiastic about adding teamster union members to the payroll, have found in the past that when teamsters are asked to occupy off-driving time at plants gainfully, the results were far from encouraging. One company attempted to send truckers to school, does not recommend it to others.

Truckers, in general, are doing a good job trying to keep up with the needs of the chemical industry, and should, if anything, gain an even bigger share of the transporting of bulk chemicals.

The Nation's Tank-Truck Fleet

	For Hire	Private	Total
General purpose	16,046	14,966	31,012
Chemical service	1,671	316	1,987
Liquid petroleum gas	977	2,100	3,077
	18,694	17,382	36,076

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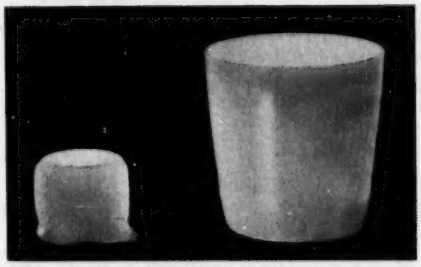

New "Poly-Eth Hi-D" (right) withstands 240° F. heat that melts down ordinary polyethylene (left). Developed by Spencer's own staff, "Poly-Eth Hi-D" has density ranging from .935 to .940. Available in commercial quantities. Write for data sheet.

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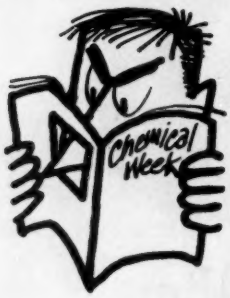

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SCHNEIDER: Humans still needed when computers write trademarks.

Creativity By the Button

How do you prime the pump when the wells of creativity run dry? Finding the answer to that question—if you're inventing trademarks—can be hardly more difficult now than flipping the switch on the nearest digital computer. For both Abbott Laboratories and Charles Pfizer have succeeded in automating (in varying degree) the imaginative aspects of trademark creation. Advertising agencies, too, are exploring the process, are reportedly interested in automated slogan making.

Abbott, first to employ the system, reports its main application is supplemental, an additional tool useful for figuring out tradenames when the powers of human thought get into a rut. Pfizer, which has refined the technique, lists four main advantages:

- Selection. Method produces a vast choice of names in a short period or time, eliminates the long "think-up" process.
- Originality. New, fresh names are offered by the system, thus avoiding repetition and duplication.
- Coverage. Numerous names that cover virtually every pharmaceutical area are produced.
- Cost. Tradenames are turned out at a cost "substantially" less than that of conventional inventiveness.

Responsibility for devising a tradename at Abbott rests primarily on its "trademark panel" comprised of representatives from such departments as advertising, sales, medical, pharmaceutical, research and marketing. At frequent "brainstorming" sessions, the group suggests an average of 100 to 400 names for a new product. Most important criteria: names must not signify the disease or its symptoms, yet be suggestive to the doctor but not to the lay public.

The digital computer comes into use only when brainstorming bogs down. Punch-hole cards, containing potential syllables, are fed into the unit, which can spew out some 3,500 names in 7 minutes.

Typical example of its use: the company's panel, seeking a name for a new, nonbarbiturate sedative, had settled upon "Placi-" as the prefix but couldn't find a suitable suffix. The machine soon provided thousands of names from which to choose. Attention focused on a group of 11: Placinol, Pacicel, Pacimel, Plasinil, Placinyl, Placidil, Placidyl, Placidril, Placitril, Placidol, Placikol. Selected: Placidyl.

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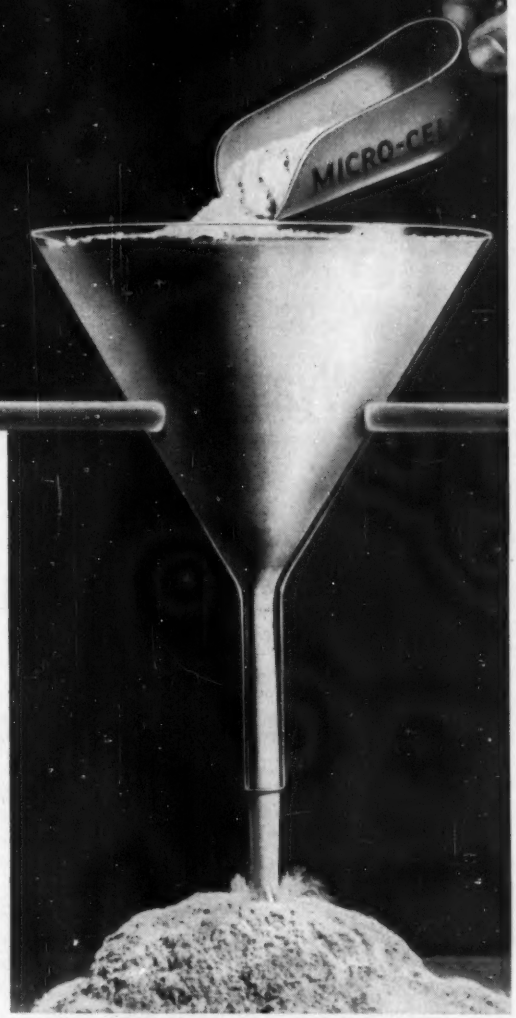

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trademark literature or pick tags that motivate doctors to buy. For that reason, says Abbott's trademark counsel, John Schneider, the method is used only as an adjunct; humans are still vitally necessary.

How It's Done: Pfizer, unlike Abbott, now starts its tradename selection by consulting the product of the electronic brain, a 200-page book containing 42,000 potential trademarks. To make this lexicon, explains operations research man Andrew Schmitz, required a considerable amount of preparation.

Objectives that drug labels would have to be simple to spell and enunciate, translatable into foreign languages, medical sounding, and relatively brief were set first. A statistically conducted survey of 50-60 publications in 11 languages revealed the most-common word endings.

Results showed that about 80% of chemical words had one of about 30 endings. This list was further pared to 10 in such fashion that the remaining endings suggested the suffixes dropped.

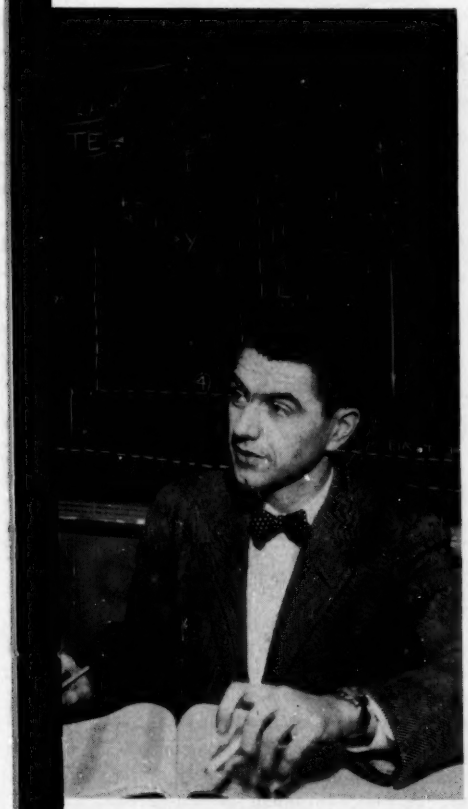
Prefixes, adds Schmitz, are obtained by supplying possible combinations of letters of the alphabet to the endings. In programming the computer, triple consonants and the letters X, Z, J and Q were dropped. Further instructions to the machine included, for example, prohibition of syllable repetition in the same word, printing only one of the chosen 10 endings with each prefix and arrangements to include short names as part of longer ones (omycin would fit into bolomycin). With such regulations, the computer pruned some 22,000 worthless names from about 65,000 potential combinations. Less than 2 hours after final programming of the machine, Pfizer had a 200-page book listing 42,000 names in four-column pages. Word sequence runs across the page rather than in a vertical list. When read "down," says Schmitz, the arrangement tends to stimulate mental combinations of prefixes and suffixes. All told, the listed names are suggestive of an additional 300,000 names.

In practice, Pfizer staffers peruse the closely guarded books to find names, turn them over to divisional heads for screening and further processing through the new products devel-

opment manager and the legal department.

Of the 42,000 names, Schmitz estimates that about 5% would meet the criteria of a good trademark, and of these, perhaps 25% would be specialized sufficiently for a new pharmaceutical. Even on such a basis, and including the cost of machine rental and all preparatory work, Pfizer calculates it's considerably cheaper to produce names automatically than by imagination.

Curiously, if other companies decide to mechanize trademark output, they're more than likely to come up with names similar to Abbott's and Pfizer's, because many letter and syllable combinations would be identical. Other uses of the idea may come. It's perfectly possible, Schmitz feels, to program a computer to obey syntax rules, hence produce words in phrases that make sense. Slogan dictionaries may be just around the corner.



PFIZER'S SCHMITZ: Pharmaceutical names, 21,000/hour.

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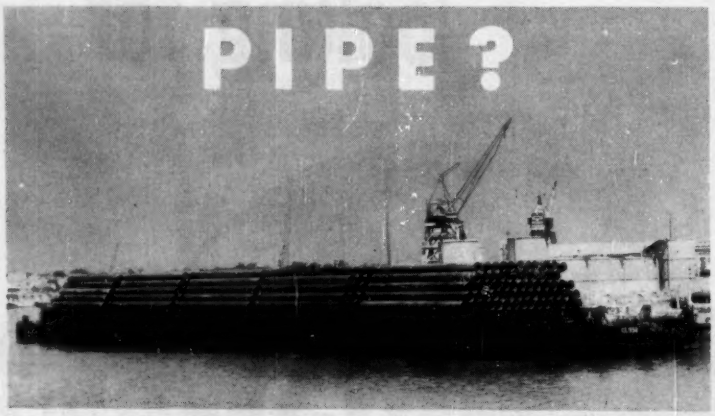

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NEW TEAM: Bradley's Griffith (top), Canco's Britzke.

They Add a Squeeze

When Olin Mathieson sold three-year-old Bradley Container Corp. for an undisclosed amount of cash (Wall Street guess: $2.5 million) last fortnight, two things were underscored:

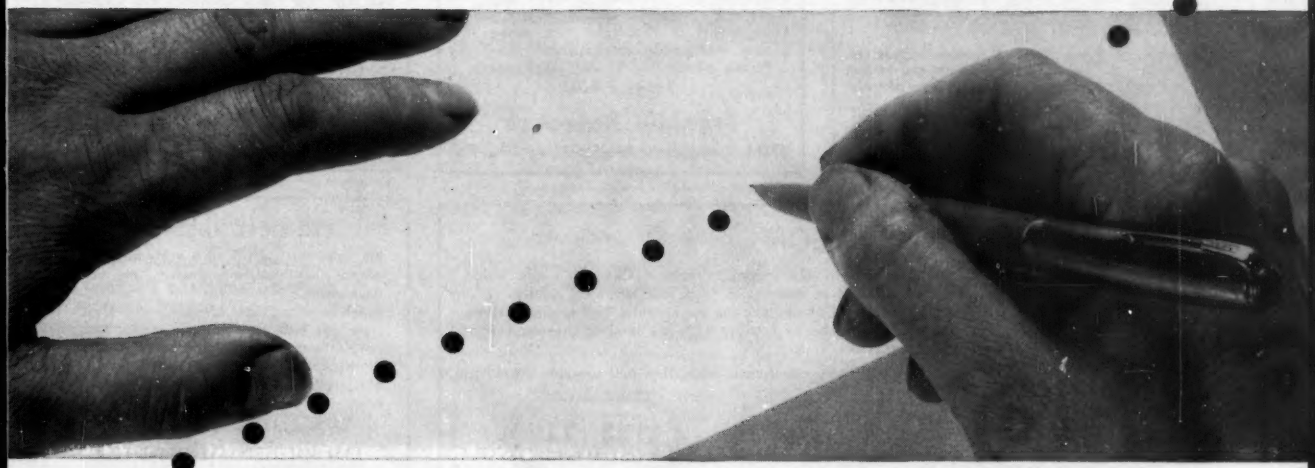
Bradley's new owner, American Can Co., has a lot of faith in Bradley's abilities and potential; and Olin Mathieson has dropped its earlier, tentative ideas of going into polyethylene production. Expansion in cellophane, chlorine-caustic soda, aluminum, paper and nuclear operations has priority.

Canco, though it's one of the largest container producers, does not make collapsible tubes. The new move puts the company squarely in this field, gives it a large share of the burgeoning "squeeze-to-use" plastic container market—a market aggressively wooed by Bradley (*CW, July 3, '54, p. 36*).

Moreover, Canco is keeping the existing Bradley operations pretty well intact. L. A. Britzke, Bradley's new general manager, affirms that manufacturing and marketing of the two firms' products will remain separate. Henry Griffith will carry on as Bradley's vice-president in charge of sales.

As a result of the deal, Canco gets

Before you sign your new contract for caustic soda



Right now is the time—before you make your new contract commitments—to carefully review the form of caustic soda you plan to buy.

If you have been buying flake or solid, you may find it a profitable move to switch to liquid.

On the other hand, if you have been buying 50% liquor, you may save substantially by converting to 73% concentration.

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So, before you make your new commitments, consult Columbia-Southern's Technical Service Department. A staff member will be assigned to review the whole picture and to help you determine the most advantageous form of caustic soda you should buy.

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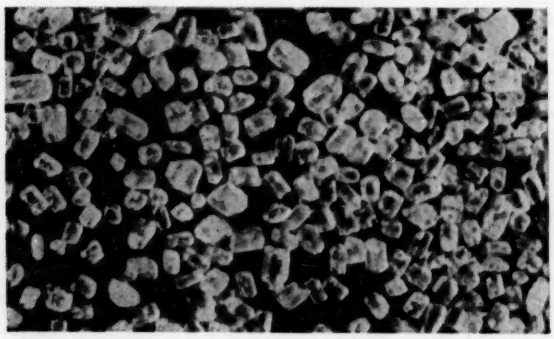

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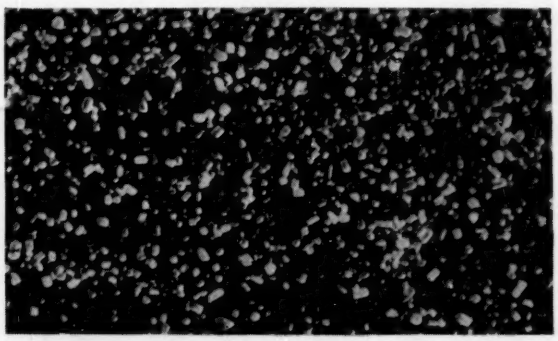

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